METROPOLITAN
TRANSPORTATION
COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
Tel.: 510.464.7700
TTY/TDD: 510.464.7769
Fax: 510.464.7848
e-mail: info@mtc.ca.gov
Web site: www.mtc.ca.gov

BAY BRIDGE DESIGN TASK FORCE
Wednesday, July 14, 1999
1 p.m.
Joseph P. Bort MetroCenter Auditorium
101 Eighth Street
Oakland, California 94607

Chairperson: Mary King
Members: Ralph Appezzato
Sue Bierman
Sharon Brown
Mark DeSaulnier
Jon Rubin
Angelo Siracusa
Staff Liaison: Steve Heminger

REVISED AGENDA

1. Welcome and introductions - Mary King, Chairperson

2. Recent project-related correspondence -- Larry Dahms, MTC*

3. Status report on final Environmental Impact Statement -- Harry Yahata, Caltrans

4. a. Presentation of detailed design information on recommended new eastern span -- Brian Maroney, Caltrans, and TY Lin design team

   b. Report on EDAP design recommendations - Larry Dahms, MTC*

   c. Presentation of EDAP recommendations - Joe Nicoletti, EDAP Chair, and Christopher Arnold, EDAP member

5. Status report on remaining Bay Bridge "amenity" options -- Larry Dahms, MTC*

6. Status report on Gateway Park -- Brian Wiese, East Bay Regional Park District

7. Other business/public comment

* Attachment sent to members, key staff, and others as appropriate. Copies available at meeting.

- over -

Every member of the Commission who is not otherwise designated as a member of this task force is an ad hoc non-voting member. Although a quorum of the Commission may be in attendance at this meeting, the task force may take action only on those matters delegated to it. The task force may not take any action as the full Commission unless this meeting has been previously noticed as a Commission meeting.

An ad hoc non-voting task force member may be designated by the task force chairperson as a voting member for this particular task force meeting if an additional voting member is needed for a task force quorum.

Public Comment: The public is encouraged to comment on agenda items at committee meetings by completing a request-to-speak card (available from staff) and passing it to the committee secretary or chairperson. Public comment may be limited by any of the procedures set forth in Section 3.09 of MTC's Procedures Manual (Resolution No. 1058, Revised) if, in the chair's judgment, it is necessary to maintain the orderly flow of business.
Record of Meeting: MTC meetings are tape recorded. Copies of recordings are available at nominal charge, or recordings may be listened to at MTC offices by appointment.
Sign Language Interpreter or Reader: If requested three (3) working days in advance, sign language interpreter or reader will be provided; for information on getting written materials in alternate formats call 510/464-7787.
Transit Access to MTC: BART to Lake Merritt Station. AC Transit buses: #11 from Piedmont or Montclair; #59A from Montclair; #62 from East or West Oakland; #35X from Alameda; #36X from Hayward.
Parking at MTC: Metered parking is available on the street. No public parking is provided.

Agenda Item No. 2

RETROFIT

VS.

REPLACEMENT

STATE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
P O BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

Dahms / Heminger / Clausen / BB Task Force

RECEIVED
MAY 21 1999
B. QUAN

May 20, 1999

Professor Abolhassan Astaneh-Asl
Department of Civil and Environmental Engineering
781 Davis Hall, University of California
Berkeley, CA 94720-1710

Dear Professor Astaneh-Asl:

I am responding to your letter to Director José Medina, dated April 20, 1999 in which you expressed your concerns about the seismic safety of the proposed New East Spans of the Bay Bridge.

You have covered several topics; therefore I have organized my comments into a point-by-point format for efficiency. I recognize that the issues discussed in your April 20, 1999 letter encompass more than the East Spans Seismic Safety Project. Your letter is as much a summary of your state of relations with the California Department of Transportation's bridge research group as it is about your desires for the Bay Bridge.

➡ *On page one in the second paragraph, you stated that in a letter to the Bay Bridge Design Task Force dated June 20, 1998 sufficient detail was offered for engineers and non-engineers to understand the concerns you have for the MTC recommended design. You further claim that in public statements on June 22 and 24 of last year at MTC meetings you made presentations that summarized these concerns.*

This project challenges engineers to span complex geology for approximately 2½ miles in the shadows of two major faults and continuously provide for necessary vehicular and marine traffic. It is important to recognize that bridge design and analysis requires tremendous attention to detail including assumptions made, parameters used and mathematical techniques employed. In the analysis phases within the design of a bridge, these items are the very definition of "sufficient detail" for engineers to understand and evaluate concerns. It is these pieces of information as well as analytical results upon which you have offered no detail in writing or otherwise for any part of the proposed design. The four bullets which you list on page two of your June 20, 1998 letter, of which the second and fourth are the same, do not represent detail to any engineer. They are simply generic statements, which are unsupported. Bridge engineering design and analysis is not a subject summarized in 2 minutes or detailed in approximately a single page of text for any bridge, and certainly not any segment of the east spans of the Bay Bridge. This is why my staff has asked you repeatedly to make a detailed, technical and professional presentation to the project team and the Seismic Safety Peer Review Panel (SSPRP). At any time, now or in the future, my staff would be more than willing to arrange for such a professional presentation.

➡ *In the paragraph that begins on the bottom of page one, you state that you received one of Dr. Maroney's early invitations to present your concerns to the project team. You imply that you refused to make such a presentation due to your concern that there exists a conflict of interest within the project's Seismic Safety Peer Review Panel (SSPRP) and the issues could not be addressed in a single meeting.*

5-27 8:40AM

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 6
To Steve Heminger	From Denis Mulligan
Co.	Co.
Dept.	Phone #
Fax #	Fax #

It is disappointing that you have continued to choose to not communicate in a professional manner with the project team and the Seismic Safety Peer Review Panel. This is particularly disappointing as you work for the State of California at the University of California at Berkeley. Caltrans has a long and outstanding relationship with the University and more than a generation of professors of civil engineering.

It is difficult to understand why you state that you cannot communicate your ideas or concerns in such a meeting, especially since an educator like yourself, skilled in public speaking from years of presentations and classroom lectures, could have successfully communicated your concerns for the design of the proposed new east spans. Any relationship starts with a first discussion. Just because one meeting is scheduled does not mean additional discussions or meetings may not need to be arranged. Nor does it mean that all issues discussed can be completely resolved. But an understanding of the issues can be developed. I again invite you to meet with the project team and the SSPRP.

As to the issue of conflict of interest, I can assure you that this is an independent panel. The members of the SSPRP for this project were selected specifically for this project. Caltrans project manager and Principal Bridge Engineer, Dr. Maroney, personally recommended the individuals for this panel based upon the State's desire to have an independent panel, which possesses the expertise to address every major seismic issue that would challenge the team on this project. The panel was designed to mirror the challenges the project team would face throughout the duration of the project on seismic related issues. Let me review for you the expert panel.

Dr. I.M. Idriss is an internationally recognized expert on site response to seismic motions. Owners and engineers throughout the world seek out his advice on matters concerning site response and stability in the design of important projects like this one. He is a Professor of Civil and Environmental Engineering at the University of California at Davis (UCD). Prior to his career at UCD, he led the geotechnical earthquake-engineering group at Woodward-Clyde while working in the private sector. It is of interest to note that Dr. Idriss recently received an award from the University of California for outstanding service to the community. It is specifically for activities such as serving on this project's SSPRP that the University of California recognized Dr. Idriss as outstanding.

Dr. Ben Gerwick is a professor emeritus at the University of California at Berkeley (UCB) in the Department of Civil Engineering. He built his internationally recognized expertise in offshore foundation design and construction through his family's engineering and construction firm. I mention the family aspect of the company, because Ben is the keeper of generations of knowledge of foundation construction. Of special interest is his knowledge of specific San Francisco Bay geology and past foundation construction successes and failures. Professor Gerwick also has tremendous experience in offshore construction as is documented in his textbook on that subject. Though some might say Dr. Gerwick is retired from the company he sold, Ben C. Gerwick Inc., most would marvel at the amount of work he does between his commitments at UCB and the company he once owned.

Dr. Frieder Seible is a professor of Structural engineering at the University of California at San Diego (UCSD) and a principal of SEQAD, an engineering consulting firm. Professor Seible is an expert in analysis including finite element methods and structural element testing. He is internationally recognized for his contributions to bridge engineering. He designed the core of the structural testing facilities at UCSD. That structural testing facility is recognized as the most productive structural laboratory in the world. Professor Seible is responsible for a significant portion of that success. Professor Seible understands design quite well. In fact, he co-authored a book on bridge seismic design and retrofit that practicing design engineers actually utilize as reference. Professor Seible is also the designer of the

only cable-stayed bridge in the State of California with the exception of the cable-stayed bridge over the Sacramento River at Meridian, designed by Dan Kirkland of the California Department of Transportation.

Mr. Jerry Fox is an expert bridge designer. Before retiring, Mr. Fox led the bridge group at HNTB, a major bridge design firm. At HNTB he designed a variety of cable-supported bridges including suspension bridges. Mr. Fox also designed long span steel and concrete bridges. Though Mr. Fox is retired from HNTB, he remains active on several bridge committees and panels guiding others with his internationally recognized expertise founded on experience designing large bridges Dr. Maroney speaks extremely highly of this man and his work. He goes as far as to say that Mr. Fox and his experience is the definition of what other bridge designers try to emulate. He is of the highest caliber of large bridge engineers.

Mr. Joseph Nicoletti is an outstanding and well recognized structural engineer. Mr. Nicoletti is with URS Greiner in San Francisco. He is a leader in the structural engineering community of California. Because of his expertise he sits on the Seismic Advisory Board that was established following the 1989 Loma Prieta Earthquake under the guidance of the Governor to continuously advise the Department of Transportation on issues of transportation seismic safety policy. Mr. Nicoletti has been the project engineer of large buildings in California's high seismic zones. He is a past Chair of the Engineering Criteria Review Board for the Bay Conservation and Development Commission and continues to hold a seat on the board. Mr. Nicoletti has a very broad range of structural engineering knowledge. It is because of this broad range of knowledge and perspective that he was asked to be chair of the SSPRP.

I believe it is important to note that more than half of this bridge is substructure. In the 'real life' practicing world of bridge engineering in California's earthquake country some amount of knowledge in one isolated area (e.g., bearings, concrete, steel, piles, etc.) is not enough. In order to fully address seismic issues on any bridge system, and particularly this one, a complex team, expert in multiple fields, needs to be mobilized. I am confident the design team is fully capable, as is the SSPRP of evaluating the seismic safety of the project.

➡ *In the first paragraph at the top of the second page you offered to be a consultant on this project.*

Caltrans advertised for statements of qualifications (SOQs) to select the design team and received such SOQs from design teams, which incorporated designers from around the world. That was your opportunity to participate in the actual design and analysis of this bridge. Though this project is well underway, I certainly do wish to encourage you to compete in future projects which may be contracted out.

➡ *On the second page you start several numbered paragraphs that offer what appears to be your perspective on a number of issues between the California Department of Transportation's bridge research group and yourself which is outside of the scope of the East Spans Seismic Safety Project.*

I have reviewed the issues surrounding your past contracted research. Although there may be different opinions on the issues, I feel comfortable noting a few items. Together the California Department of Transportation and you have a history of working together that dates back to 1989. Together we have enjoyed some successes and experienced some disappointments. In that work together, managers within the Department of Transportation, in continuously reviewing Department research investments, have evaluated the disappointments to be too great in magnitude and frequency. This apparently has led to the Department to invest scarce research funds into projects that have a higher rate of success than those you have led. It should be pointed out that the competition for research funds is great.

I know of no California Department of Transportation officials, which have openly and publicly attacked your character or anyone else's character. This is simply not the way the Department conducts itself. I should point out that the evaluations that the department does carry out on all research proposals are recorded. A poor performance evaluation should not be interpreted as an attack on any one's character. Investment evaluations are simply good business practices. I am sure if you asked to meet with our Engineering Service Center staff; they would be more than willing to offer you ideas to improve your research proposal ratings. They are always been helpful and responsive.

➡ *In the last paragraph on the third page you state the California Department of Transportation and MTC have an apparent lack of interest in seismic safety for the East Spans Seismic Safety Project.*

Safety is unquestionably the California Department of Transportation's number one priority. The project team was selected with this in mind. Safety is central, and will remain central to the project.

➡ *In the second paragraph on page five, you continue your references to your ongoing studies and discussions with a number of prominent engineers and researchers in this field. You also continue to avoid details on any specifics on the bridge. In this paragraph there are also a number of extreme statements and references made with respect to the project team and the SSPRP.*

I will repeat what Dr. Maroney has already demonstrated on more than one occasion. The Department continues to be more than willing to welcome you, or any other prominent engineer or researcher, to share any concerns with the project team and the SSPRP in an appropriately detailed manner (i.e., assumptions, calculations, conclusions, etc.) and in a professional environment. I also believe the MTC Engineering and Design Advisory Board (EDAP) is a body of prominent engineers and researchers. Through the many meetings, more than ample opportunities were available to surface and discuss any multitude of issues.

With respect to the statements about the project team and the SSPRP, I will emphasize to you that the project team was selected through an internationally competitive process, which was based upon identifying the most qualified groups of professionals to work on this specific project team. In-house staff are some of the Department's most talented and capable engineers, architects and planners who were hand picked for this project. Finally, as stated above, the SSPRP is extremely qualified.

➡ *On page five and six of the letter you make several statements concerning the existing east spans of the Bay Bridge.*

The east spans of the Bay Bridge cannot be retrofitted for seismic safety and performance for $200 or $260 million. Even in a retrofitted state, the existing bridge would not offer near the reliability of a new structure with far fewer members and connections given modern construction quality control. Your references to your early work on the bridge, during a time in which the toll bridge retrofit program was truly in a research phase before Department design engineers were assigned to the bridge in late 1994, is not applicable. It is my understanding that you yourself, have warned Caltrans that the work was not to be used for design.

The East Spans Seismic Safety Project strategy to replace the structure was not easily concluded. Complex design teams worked to develop retrofit strategies to satisfy given performance criteria. The designs, while under development, were presented to an independent SSPRP in a detailed, technical and professional manner. In these presentations, multiple alternatives with their costs were presented. Replacement, as an alternative, was also presented. The project team considered replacement the better economic and generally most optimum solution. The SSPRP agreed. Then, the Seismic Advisory Board (SAB), which advises the Department on seismic policy issues reviewed the project and also agreed. An independent and second opinion was obtained through a value analysis review by a consortium of engineers led by Bill Ventry. They similarly concluded replacement was the best alternative. Then, when SB60 was signed, the Metropolitan Transportation Commission, was assigned the authority and responsibility of bridge type selection. The Commission created the Bay Bridge Design Task Force (BBDTF) and the EDAP to advise the full Commission on several project-related issues. One of the first actions was to reconsider the retrofit/replacement decision. At all levels of this MTC defined process, it was concluded that replacement was the proper course of action. I can state that in no other project or program that I have been involved in, has the State and local communities gone to such extreme measures to verify that the decisions made were the correct ones.

The continuous threat posed by the Hayward and San Andreas Fault systems has been uppermost in the minds of the designers in all phases and venues of this project. Short term and long term probabilities of an event have been discussed. It was clearly stated that the existing bridge was likely to experience collapse in the event of a large, or even a moderate earthquake. It is because of this concern, the interim retrofit project was recommended and the new design for the new east span is being advanced as fast as possible. Even in the retrofit state provided by the interim retrofit, the bridge remains vulnerable to a moderate or large earthquake.

I trust this letter helps you to understand the California Department of Transportation's position on the numerous issues you have raised. The most important issue is to understand clearly that the Department's highest priority is safety, and I hope you will assist in that goal by meeting with the project team and SSPRP. If you wish to schedule a time to present your concerns, please contact Brian Maroney at (510) 286-5885.

Sincerely,

Harry Y. Yahata

HARRY Y. YAHATA
District Director

c: Larry Dahms-MTC

BM/SH:jwl

cc: JMedina
HYahata
DMulligan
BMaroney
SHulsebus
JRoberts
JAllison - ESC
JDrago
AAkinsanya - ESC
GBayol
Executive Reading File
Legislative File
PIO

UNIVERSITY OF CALIFORNIA, BERKELEY

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO • SANTA BARBARA • SANTA CRUZ

Abolhassan Astaneh-Asl, Ph. D., P.E, Professor
Department of Civil and Environmental Engineering
781 Davis Hall, University of California,
Berkeley, CA 94720-1710, USA
Phone: (510)-642-4528 Fax: (510)-643-5258, e-mail: astaneh@ce.berkeley.edu

April 20, 1999

CERTIFIED MAIL

Mr. Jose Medina, Director
California Department of Transportation
1120 N Street
Sacramento, CA 95814

Subject: Safety Problems of Proposed Bay Bridge Spans

Dear Mr. Medina:

I would like to congratulate you on your appointment as Director of Caltrans. And I would like to provide you with a brief background on the issue of seismic safety of the Proposed East Spans of the Bay Bridge.

I had expressed my opinions regarding seismic safety problems of the proposed East Spans of the Bay Bridge to MTC and Caltrans in a letter dated June 20, 1998 (Attachment A). The letter included sufficient details for engineers, and even non-engineers, to understand my concerns. I attended the public meeting of the MTC on June 22 and June 24, 98 and using my 2 minutes of allocated public comment time at each meeting, summarized my concerns and pleaded with the MTC Bay Bridge Design Task Force and the MTC Commissioners not to approve this seemingly unstable structure. Apparently, Mr. James Roberts, the then Director of Caltrans Engineering Service Center, and currently your Deputy Director, had written a 5-page letter to MTC (Attachment B) dated June 23, 98, responding to my concerns and dismissing them. I did not know about this Caltrans response until a few weeks ago when a reporter faxed it to me.

Later in July of 1998, I received a letter from Dr. Maroney of Caltrans (Attachment C) asking me to present my concerns on seismic safety problems of the proposed bridge to a Peer Review Panel. I responded to his letter at the time (Attachment D) and expressed my concerns on strong apparent conflict of interest on the project Peer Review Panel. I noticed that the chair and some members of the supposedly independent Peer Review Panel were part of the design team or were subcontractors

to the design team. In my response I offered Caltrans my willingness to participate in helping Caltrans to address seismic safety problems of the proposed design as I have done in many projects since the 1989 earthquake. However, I did not hear from Caltrans for more than a year until this recent letter of Dr. Maroney.

In his most recent letter to me (Attachment E), Dr. Maroney indicates: "I continue to regret your decision to not share with the project design team and the Seismic Safety Peer Review Panel your concerns on the MTC recommended bridge design in a detailed manner in a professional environment". I would like to state that since 1997 that I have been involved with the new bridge design and I have expressed my opinion and technical findings to Caltrans and MTC in duly formed public hearings about seismic safety problems of this bridge, I have been subjected to extreme pressures and personal attacks by the Caltrans and MTC officials and staff including:

1. I have a long-standing collaborative research interaction with scientists and engineers at the Lawrence Livermore National Laboratory. We have been conducting joint seismic research using analytical expertise as well as powerful computers and software of the LLNL. As I started the study of the potential replacements for the East Spans of the Bay Bridge, Caltrans top officials contacted top officials of the Lawrence Livermore National Laboratory to indicate to them not to allow their scientists and engineers to collaborate with us on the East Bay Bridge project. As a result, I was not been able to utilize such a valuable resource.

2. Caltrans has abruptly terminated my three research projects at UC-Berkeley, sponsored by Caltrans, and refused to reimburse the University for the cost of the project. This was done at the time that we had almost completed the all three research projects, had given final reports to Caltrans and helped Caltrans engineers and consultants to use our results to save tens of millions of taxpayers money in seismic retrofit design of toll bridges of California. Using the results of one of my research projects (the pile studies) in one bridge alone (Carquinez) we were able to save taxpayers more than $5 million and have much safer and more reliable retrofit design. The reason Caltrans gave UC-Berkeley for this totally unjustified and most likely illegal termination of my research projects was that "Caltrans has not received 100 copies of bound and printed final reports"! Of course, we had provided Caltrans with the final results and reports several months ahead of due date and had even assisted Caltrans engineers and consultants in interpretation and proper use of the results. The abrupt termination of my research projects, in the middle of academic year (1/2/98) resulted in serious damage to my reputation as a researcher who does high quality research and delivers the results in time. The damage has been particularly serious among my colleagues and funding agencies. More importantly, the termination of contracts by Caltrans caused termination of graduate research assistantship to my graduate student research assistants putting their financial and academic situation in total chaos and their education in jeopardy.

3. Caltrans officials and spokespersons have openly and public attacked my character and have questioned my motives for bringing these serious safety concerns to the attention of proper authorities. The reporters have continuously been told by Caltrans and MTC officials that the reason I am discussing serious safety issues is that I am upset because the proposal that we had submitted to MTC Bay Bridge Design Task Force in 1997 was rejected. I find this

totally false statement by Caltrans very damaging to my personal and professional integrity among my colleagues and students.

4. In the past I have provided some consulting services to Caltrans consultants in assisting them in more challenging aspects of seismic retrofit projects. Caltrans has placed a false evaluation form in my file within Caltrans almost officially blacklisting me and denying me future opportunities for consulting. In the evaluation form, although my technical competence and contributions have been rated as 9 out of a maximum of 10, but, the overall rating of my performance, which is an important indicator, is given as 4!

5. Caltrans has just started an effort to disrupt one of my research projects that is funded by the National Science Foundation. The project, an important seismic safety research, is on the study of seismic behavior and design of composite shear walls in buildings and bridges. Caltrans is asking us to dismantle the test set up for this project and return to Caltrans a piece of equipment that we had purchased as part of a Caltrans funded project to study steel piles. As I indicated earlier, our results of that successful project resulted in millions of dollars of saving in seismic retrofit of toll bridges (more than $5M in Carquinez Bridge alone). At the end of that project last year Caltrans agreed for us to keep and use the equipment in our future research projects. Based on that agreement, I submitted the shear wall proposal to NSF which it was reviewed, funded and is currently underway. If this equipment is taken away from our laboratory, this NSF research project, which is quite important to seismic safety of buildings and bridges, will be completely disrupted along with the disruption of education and dissertations of one doctoral and three MS students.

I would like to state for the record that my only reason for expressing safety concerns is that when I accepted my current position at UC-Berkeley, I executed the State Oath of Allegiance to faithfully discharge my duties. In my case, this includes conducting research on seismic behavior and safety of buildings and bridges and providing the results to the users and public at large. As a public servant, to fulfill my oath, I will serve the State of California and the United States to the best of my professional abilities. I have been studying seismic behavior and structural safety of long span steel bridges (of which the proposed bridge is one) extensively for the last 10 years throughout the world. Particularly, I have studied the Bay Bridge and have conducted numerous research, testing and design projects on this bridge since the 1989 Loma Prieta earthquake. Even currently I have a major multi-year research project, sponsored by UC-Berkeley and LLNL to study seismic behavior of the suspension spans of the Bay Bridge. When I realized the very serious safety and stability problems of the proposed self-anchored, single-tower bridge before it was approved in 1998, it was my moral and professional obligation to bring my findings and information to the proper authorities, which were Caltrans and the MTC. I was expecting that, Caltrans and the MTC would at least review the concerns and in a professional manner would at least have an independent panel of experts review them. Instead, Caltrans and MTC officials and their spokesmen have launched a campaign of personal attacks and harassment against me.

Regardless of Caltrans' and the MTC's apparent lack of interest in the seismic safety issues of this project, my dedication to the safety of the people of California (which includes my own family and myself) is unwavering and strong enough to enable me to focus on my current independent and un-sponsored studies of the safety issues of this bridge. Later, I am sure there will be appropriate

authorities and venues to investigate the entire process of decision-making within Caltrans and the MTC regarding the seismic safety of this and other Caltrans bridges.

As for presenting my findings to Caltrans Seismic Safety Peer Review Panel, I would like to have more information about the make up of the Seismic Safety Peer Review Panel to ensure that: (a) the members of the panel do not have financial or other conflicts of interest with the design team, and; (b) the members of panel are experts (or at least minimally knowledgeable) in the field in which they are charged to conduct a peer review. In this case the field is "Seismic Behavior and Design of Long Span Steel Bridges". Conditions a) and b) should be met for any peer review panel. Unless you can prove with documentation that I am wrong, the current membership of the Bay Bridge Seismic Safety Peer Review Panel, indicated in Attachment F, grossly violates both of the above principles.

All five members of the Seismic Safety Peer Review Panel of Caltrans for this project (see Attachment F) have very strong conflicts of interest with this proposal. They all were, and still are members of the MTC's Engineering Design Advisory Panel (EDAP) which approved the proposed self-anchored bridge design last year despite concerns expressed by independent experts such as myself and even by some other EDAP members. The chair of the Peer Review Panel is the same as chair of EDAP. In fact one member of the Caltrans Seismic Safety Peer Review Panel for this project, while on the EDAP, had submitted this "self-anchored, single tower" design for the review of EDAP! The design was one of the four finalists selected by EDAP. Not surprisingly all four selected finalists were submitted by EDAP members and were reviewed and voted upon by those who had submitted them! The extent of conflict of interest in the Seismic Safety Peer Review Panel of this project is unbelievable. For example, one of the Peer Review Panel members is also a member of the design team. Another member, according to news reports has a large grant from Caltrans to test components of this bridge design and even though he is not even in this field and does not have any experience or knowledge of seismic behavior and design of long span steel bridges, has indicated his very strong support for this design, perhaps to please Caltrans and MTC.

As for the expertise of the panel members listed in Attachment F, perhaps they are experts in other fields, however, I need to state that NONE of the panel members are in the field of seismic behavior and design of long span steel bridges which is the expertise needed to review seismic safety of the proposed bridge. I cannot imagine a meaningful meeting with this panel where none of the members have even the minimal background, knowledge or experience with the issues that I have raised. The lack of independence and expertise also is equally applicable to almost all Caltrans and MTC staff and engineers involved in this project including Caltrans Project Manager for this project.

I hope under your leadership, a comprehensive review of all aspects of decision making inside Caltrans with regard to safety of California bridges will be conducted by an independent group of auditors. Such review should include an investigation of very apparent serious conflict of interest in almost all Caltrans panels and committees particularly: Caltrans Seismic Safety Peer Review Panels, Caltrans Seismic Advisory Board and Caltrans Research Advisory Committee. These panels and boards are charged with reviewing seismic retrofit design for existing bridges as well as review of seismic safety of new bridge designs. Also, they are charged with selection of Caltrans contractors and consultants or with reviewing their work. Observing how Caltrans operated for the

last 10 years, I am of the opinion that the technical problems of this proposed bridge, are only symptoms of a much bigger problem: serious conflict of interest within Caltrans oversight, review and advisory panels and boards, as well as Caltrans' apparent practice of awarding design and construction contracts to a few firms and individuals they favor. Until Caltrans Peer Review Panels are constituted with membership that is truly independent, has no conflict of interest and have the necessary expertise for review, in order to preserve my professional integrity and uphold the laws regarding independence of Peer Review Panels I do not wish in any way to get involved with such panels.

Based on the results of my ongoing studies of this proposed bridge and discussion of results with a number of prominent engineers and researchers in the field, all of whom privately agree with my concerns, I cannot imagine that this structure will actually be built. Some of these independent experts were horrified when for the first time they saw the structural system used in this bridge and its details. They have used the words such as "this is a bad joke", "unbelievable", "how could this happen?" "Is anyone going to sign these drawings?" as they have reacted to this structure. The way this bridge is being designed, with all the conflict of interests in almost all aspects of it, as well as the lack of necessary expertise in the design team, peer review panel and Caltrans project team, the warning signs of a disaster and catastrophe cannot be ignored. The LA Times (3/1/99) reported that in January of this year two bridges collapsed in China killing 47 people and injuring more than 30 others and the cause was related to rampant corruption and slapdash construction. In addition, in September of 1998, a 1.5 mile long span started to quiver and sway and inspectors soon discovered the cause: cracks in the bridge stemming from design flaws. (LA Times, 3/1/99).

As Attachment A indicates, in June of 1998, at public hearings of MTC, twice I expressed "concerns" about seismic safety problems of the proposed bridge and submitted the details of problems in writing to the MTC and Caltrans. Now after about a year of further extensive studies, I have concluded that this "self-anchored, single-tower" bridge is seismically unsafe and can in fact be a "safety hazard" under seismic and even non-seismic effects.

I need to repeat my plea that, if Caltrans is truly interested in the safety of the Bay Bridge, it needs to start immediately retrofitting the existing bridge such that in the event of an earthquake, it does not collapse and kill or injure people. In fact, based on my extensive studies of the existing East Spans over the last 10 years and the proposed design for the last two years, if the existing bridge is retrofitted using proper retrofit strategies, it will be far safer that the new proposed bridge. In 1992, using the results of 3 years of study of existing East Spans, I had prepared and submitted a report to Caltrans on how the existing bridge can be safely and efficiently retrofitted. The cost of such retrofit of the East Bay spans was estimated to be less than $260M. I do not know what happened to that report and why Caltrans has not done anything to fix this bridge against collapse and loss of life if it believes such events could occur.

Caltrans has repeatedly stated, especially since 1996, that the existing structure of the East Spans of the Bay Bridge is unable to withstand a future major earthquake. Based on the results of our extensive studies of the existing East Bay Spans, I cannot confirm this statement. However, if Caltrans has come to this conclusion then Caltrans should either close down immediately the existing East Spans to avoid deaths and injuries, or if the bridge cannot be closed down for economical or other reasons, Caltrans, as the agency responsible for the safety of people who use

this bridge, should immediately add safety retrofit measures such that in the event of an earthquake, which can occur anytime, the bridge does not kill or injure people. As you know more than 285,000 people cross that bridge everyday.

Knowing that a structure under your responsibility is unsafe and permitting people to use it makes Caltrans and its officials directly responsible for the lives that can be lost on the structure in the event of a major earthquake. If such a tragic event occurs and bridge users get killed or injured on this bridge, Caltrans will be liable since it cannot claim that either it did not know about the seismic safety hazards, or that there was nothing that Caltrans could have done to prevent such deaths and injuries. In addition, Caltrans cannot claim that it did not have funding or technical solutions to add such emergency safety measures since after the Loma Prieta earthquake, the State Legislature has allocated sufficient funding for this purpose such that according to news reports over the last 10 years, Caltrans always had more funding for retrofit of this bridge than it could actually spend. In fact, instead of doing this emergency retrofit which should not have cost more than $200M and providing immediate safety, Caltrans has left the bridge users to use an unsafe bridge (according to Caltrans) for ten years and has spent more than $40M on the design of a highly questionable new bridge which even if it proceeds as scheduled, will result in subjecting people to a very hazardous condition (according to Caltrans) for several more years. As for the technical solutions for efficient retrofit of the existing East bay Bridge, in 1992, based on 3 years of study sponsored by Caltrans, I submitted a report to Caltrans outlining the retrofit strategies for the bridge.

If Caltrans had taken its responsibility for the seismic safety of our bridges seriously, the existing East Spans of the Bay Bridge could have been shored up and retrofitted immediately after Caltrans realized there was a possibility of people getting killed or injured by it. This should have been done during the last 10 years since the 1989 Loma Prieta earthquake.

Does Caltrans plan to fix the existing bridge against collapse or close it?

On the proposed self-anchored suspension bridge, I would like to remind you that a few weeks ago, the Honorable Governor Davis, stated that he would like to see this project (the proposed bridge) move forward if it is safe, cost efficient and fulfills the transportation needs of the Bay Area. As for the safety, we are finding many aspects of this bridge unsafe and I am sure if Caltrans ever forms an "independent" and "expert" Peer Review Panel to analyze this bridge, such panel will also find similar flaws. As for the cost efficiency, Mr. Roberts, your Deputy Director, in his letter to MTC last year (Attachment B) has clearly stated that this design is not cost efficient. As for fulfilling transportation needs of the Bay Area, this bridge has exactly the same capacity (10 car lanes) as the existing bridge which already has long traffic jams. Even bike/pedestrian lanes were added only after unbearable pressure was exerted on MTC by bikers. For a bridge that supposedly should be useful for next 150 years, no rail capacity is considered! Even now after people of the Bay area overwhelmingly have approved putting rail on the bridge, MTC/Caltrans is refusing to add the rail.

Since it is clear that none of the three needs (safety, cost efficiency transportation capacity) that Governor Davis has asked for are provided for in this proposed bridge, then why Caltrans is continuing to waste taxpayers money and time (more than $40M and 2 years so far) on this design?

Finally I must add that last week, while I was out of town, the attached certified letter from Dr. Maroney of Caltrans (Attachment E) arrived at my *home* address. My family and I would appreciate it very much if all Caltrans correspondence and packages were mailed to my office address above. I also would like to request that my home address be removed from all Caltrans mailing lists.

I am looking forward to your response to the aforementioned safety concerns, which I have raised repeatedly for almost 2 years. I hope under your Directorship, these concerns will be seriously considered by an independent and expert panel and will be addressed. In the meantime, despite Caltrans/MTC lack of interest in my independent studies I will continue my research, particularly on *seismic and non-seismic safety problems* of this proposed bridge and publish and present the results.

Sincerely,

Abolhassan Astaneh-Asl.

Abolhassan Astaneh-Asl, Ph.D., P.E.
Professor, University of California, Berkeley; and
Registered Professional Engineer, State of California

Cc: The Honorable Governor Gray Davis
The Honorable Senators Dianne Feinstein and Barbara Boxer
The Honorable Mayor Willie Brown, San Francisco
The Honorable Mayor Jerry Brown, Oakland
The Honorable Mayor Shirley Dean, Berkeley
The Honorable Vice Mayor Ken Bukowski, Emeryville
The Honorable State Senators and Legislators
Maria Contreras-Sweet, Secretary of the California Business, Transportation & Housing Agency
Bay Area elected officials, UC-Berkeley Officials, Public and News Media

---

Dr. A. Astaneh is a professor of structural engineering at the University of California at Berkeley and a Registered Professional Engineer in State of California. Since the 1989 Loma Prieta earthquake, he has led a number of research projects to study seismic behavior and has been involved in seismic design of retrofit for existing bridges or seismic design of new long span bridges. He has done research and proof-testing of critical elements of the Golden Gate Bridge, East Spans and West Spans of the Bay bridge, Richmond San Rafael Carquinez bridges, Hayward San Mateo Bridge, and more than 12 smaller steel bridges in Los Angeles. Since 1993, he has been seismic retrofit advisor for the Auckland Harbour Bridge in New Zealand. He has also done extensive research and has been the principal investigator on evaluating seismic performance and design of steel bridges, particularly long span bridges, in the aftermath of the following earthquakes: 1985 Mexico, 1987 Whittier, 1989 Loma Prieta, 1990, Roodbar, 1994 Northridge and 1995 Kobe Japan. He has done conceptual seismic design of the main span of the Rama-8 bridge, a major cable-stayed bridge in Thailand He has also done the structural design of the "Astaneh-Black" cable stayed bridge which was submitted to MTC Bay Bridge Design Task Force in 1997.
The opinions expressed in this document are those of the author and do not necessarily represent the views of the University of California at Berkeley.

Attachments to
A. Astaneh's Letter to J. Medina
April 20, 1999

Attachment A: A. Astaneh's June 20, 98 letter to M. King of MTC
Attachment B: J. Roberts of Caltrns' June 23, 98 letter to MTC
Attachment C: B. Maroney of Caltrans' July 8, 98 letter to A. Astaneh
Attachment D: A. Astaneh's July July 24, 98 letter to J. Roberts of Caltrans
Attachment E: B. Moroney of Caltrans' March 25, 99 letter to A. Astaneh
Attachment F: Caltrans Seismic Safety Peer Review Panel's letter to Governor Davis.

Abolhassan Astaneh-Asl[1], Ph.D., P.E.,
781 Davis Hall, University of California, Berkeley, CA, 94720-1710
Phone: (510) 642-4528, Fax: (510) 643-5258, e-mail: astaneh@ce.berkelev.edu

To: Mary King (Chair), Sharon Brown, Mark DeSaulnier,, Elihu Harris , Tom Hsieh, Jon Rubin, Angelo Siracusa, (Bay Bridge Design Task Force)

Date: June 20, 1998

Subject: Concerns on Seismic Safety of the New East Bay Bridge Design

The Chair and Members of the Task Force:

I have just completed an independent and careful study of the seismic safety of the "self-anchored" suspension bridge, the design that you are currently considering for replacement of the East Span of the Bay Bridge. Several major items about seismic safety of the proposed bridge gravely concern me. I am convinced that if the proposed self-anchored bridge is constructed and the Hayward Fault ruptures, there is a high probability that the resulting earthquake can severely damage this bridge and possibly cause partial or catastrophic failure of the main span (during construction and/or after completion). Even the design report:"30% Selection Report, May 98" prepared by the design team for Caltrans indicates that there will be structural damage to the main tower and possibly a permanent bend in the tower. Aslo, the design report raises the possibility of various failures under or around the foundations of main tower, which is supported on the steep slopes of the fractured Yerba Buena Island.

The SFOBB is perhaps the most important bridge in the U.S. with more than 285,000 cars crossing it daily. It is however, located between two major active faults. Given the fact that we know little about what kind of earthquakes can hit this bridge in the future, the damage it would sustain could be far more serious than anticipated. In my opinion, there is no rational in spending $1.5 billion to build a bridge of this importance using a highly questionable system that will very likely be unstable during a major seismic event.

Unlike regular suspension bridges, where main cables are connected to very large concrete anchor blocks, which are firmly embedded in the solid ground, in the proposed "self-anchored" suspension bridge, there are no anchor blocks. The main cables are connected to the deck of the bridge. There are no major bridges built using this system and there is no experience and data on seismic performance of such a system. In the literature, there is almost no information about this so-called self-anchored suspension bridge system. Only Niels J. Gimsing, one of the most prominent bridge engineers of the world and Professor at Technical University of Denmark, has a short paragraph on self-anchored suspension bridges in his book: "Cable Supported Bridges". He considers this system inferior to other bridge systems.

In addition to the possible overall instability of the proposed bridge, I am also concerned about the following:

- Supporting the main towers on piles instead of firm rock,
- connection of main span to skyway (which in current design may not survive large earthquakes and may result in collapse of the span)
- The performance of two decks separated from each other with more than50ft
- The joints connecting the main span to the rest of the bridge.

If at any of these weak points, the performance is not as the designers assumed, partial collapse can occur.

Knowing your commitment to public seismic safety, I hope you will give serious consideration to the issues raised. I plead with you to discuss the seismic safety of the existing East Bay spans at your next meeting. As you may know, Caltrans is spending more than $50 million to strengthen the existing East Bay structure. This prudent move on the part of Caltrans can ensure that if during the next 5-6 years a major earthquake occurs, people will not get killed or seriously injured on the existing East Bay spans. In addition, in seeing how fast Caltrans rebuilt the collapsed freeways in Los Angeles after the Northridge earthquake, it should be possible for Caltrans to expedite strengthening of the East Bay span and make it safe by this Christmas. Having done that, your task force has fulfilled its responsibility for seismic safety.

After the existing bridge is made safe, the current panic and rush to get a new bridge - any bridge, safe or unsafe - will subside. Without the prevailing anxiety, a proper process (perhaps including an open international competition) would lead to a selection of a seismically safe and aesthetically pleasing bridge designed to serve the people of The Bay Area for the next century and beyond.

Sincerely yours,

Abolhassan Astaneh-Asl

cc: The Honorable Governor Wilson,
The Honorable Mayors of San Francisco, Willie Brown, The Honorable Mayor of Berkeley, Shirley Dean,
The Honorable Mayor of Emeryville, Ken Bukowski, The Honorable Mayor of Oakland, Elihu Harris,
The Honorable Mayor-elect of Oakland, Jerry Brown, The Honorable Mayor of Alameda,
The Honorable Mayor of Alameda, Ralph Appezzatto, The Honorable Mayor of Albany, Bruce Mast,
The Honorable Mayor of Richmond, Rosemary Corbin, The Honorable Mayor of El Cerritto, Jane Bartke,
The Honorable Mayor of Piedmont, Patty White, The Honorable Mayor of San Leandro, Ellen Corbett,
Van Loben Sels, Director, Caltrans.

1. A. Astaneh-Asl is a professor of structural engineering at the University of California, Berkeley. His area of specialty is seismic behavior and design of buildings and bridges. Since the 1989 Loma Prieta earthquake, he has been heavily involved in seismic studies and research as well as seismic design and retrofit of major bridges in California, Japan, New Zealand and Thailand. He has conducted several studies and testing of the East Spans of the Bay Bridge and the Golden Gate Bridge. He has been on the seismic retrofit design team of the Carquinez bridges and was a seismic advisor to retrofit design of Hayward San Mateo and Richmond San Rafael bridges.
The opinions expressed here are solely those of the author and do not necessarily reflect the views of the University of California or agencies and individuals whose names appear here.

STATE OF CALIFORNIA – BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
ENGINEERING SERVICE CENTER
P.O. BOX 942874, MS 9
SACRAMENTO, CA 94274-0001
(916) 227-8808
TDD: (916) 654-4014
FAX: (916) 227-8251

June 23, 1998

Dear

We have read the letter from Professor Astaneh to you dated June 20, 1998, and have the following comments:

In a very large earthquake, some damage to the self-anchored suspension bridge can be expected. But it is wrong for Professor Astaneh to imply that this is a design flaw, as he does in the first paragraph of his letter. In earthquake engineering, damage is a technical term referring to the deformations of materials and structures beyond their elastic limit or yield point. But modern materials can sustain deformations and carry load well beyond this point, without compromising safety.

Indeed the notion of controlled, limited damage is central to the modern seismic design of both buildings and bridges. Modern bridges, in particular, contain a ductile lateral load resisting system. In an earthquake, the yielding – i.e., the damage -- of this system absorbs energy and prevents collapse of the rest of the structure.

In the proposed design of the self-anchored suspension bridge the ductile lateral load resisting system consists of the main tower and also the east and west piers supporting the ends of the main and side spans. The lateral design of the main tower includes structural fuses, or links, between the four vertical elements that carry the dead weight of the bridge. It is these fuses where damage can be expected in a very large earthquake. But this yielding is intentional. The links are designed to protect the vertical load carrying elements of the tower, and the bridge deck.

The seismic design of the suspension bridge is for an earthquake with a return period of 1500 years. This design earthquake has an annual probability of occurrence of 0.00067. During the 150 years design life of the bridge there is only a 10% chance that the design ground motions will actually occur. And even during this unlikely event, the damage to the links in the main tower will not be so severe as to require closure of the bridge, either for inspection, or for

repair. The links will be designed conservatively, so that they will be able to resist aftershocks easily. Future engineers may consider it prudent to replace the links after a great earthquake. However, in the same way that the air-bags in an automobile are replaced after a crash.

The issue of a permanent bend in the towers must also be put in proper context. Permanent deformations of a structure are a normal and unavoidable consequence of any modern seismic design. These deformations derive from the yielding of the ductile lateral load resisting system that protects the structure from collapse. We do not expect the deformations of the main tower of the new suspension bridge to be particularly large, however, and they will not compromise the safety of the bridge. Also any permanent deformations could be removed by replacing the links between the tower shafts. Also, it should be kept in mind that these deformations will occur about every 1500 years. We would not expect significant permanent deformations to occur during the smaller earthquakes -- like the Loma Prieta earthquake -- that will occur more frequently.

Professor Astaneh's reference to "steep slopes of the fractures Yerba Buena Island" should also be put in proper perspective. The slope of the rock is not a severe problem; it is just something that has to be dealt with in design and in construction. It is a natural condition that any bridge at the site would have to contend with. Contrary to the implication of Professor Astaneh's letter the rock at Yerba Buena Island is actually quite competent and better than that found at most bridge sites. Furthermore, almost all rock is fractured to one degree or another. Several borings have been made in the vicinity of the main tower, and additional borings will be made in the near future. With the data gathered from these borings, we will be able to design highly reliable foundations.

We do not object to Professor Astaneh's claim that the SFOBB is the "most important bridge in the U.S." or to his observation that it lies between two significant faults. But his statement that "we know little about what kind of earthquakes can hit this bridge in the future" is hyperbole, not fact. Actually, although we don't know everything about the ground motions that will shake the bridge in the future, we know quite a bit.

The San Andreas and Hayward faults are not black boxes, about which we know nothing. These faults have been extensively studied. The ground motions for design of the new bridge are being prepared by the seismologists who have done many of these studies. They know the faults as well as anyone. No seismologist would claim that he can predict future ground motions with a high degree of accuracy, on the other hand, so the design ground motions for the new bridge are based on a probabilistic assessment of future earthquakes. This builds some conservatism into the design motions. Uncertainty in ground motions is something that all bridge designs must contend with regardless of type. Both of the finalist designs, the single-tower suspension

bridge and the cable-stayed bridge, were designed to a conservative criteria to ensure that they would remain open to traffic after a major earthquake. Both designs have a large reserve against unanticipated motions.

The most damming statement in Professor Astaneh's letter is that the bridge utilizes "a highly questionable system that will very likely be unstable during a major seismic event". It is difficult for us to respond to this statement since he does not clearly state what about the system is highly questionable, or in what manner it is likely to become unstable.

Possibly his objections stem from the self-anchored nature of the bridge. It is true that self-anchored suspension bridges are not a common bridge type, but this is for reasons other than their seismic safety. The truth is that self-anchored suspension bridges are not especially efficient structures. They are difficult to build and, hence, expensive. Conventional earth-anchored suspension bridges (not applicable here) and cable-stayed bridges are easier to build and cheaper. This is the motivation for Professor Gimsing's dislike of self-anchored suspension bridges, not their seismic reliability (or supposed lack thereof). The choice of a self-anchored suspension bridge over a cable-stayed bridge for the new East Bay Bridge is a triumph of aesthetics over cost, not over seismic reliability. Putting aside a cable-stayed bridge (as the MTC has done), we can compare a self-anchored suspension bridge to a conventional earth-anchored suspension bridge. Because they are flexible, this type of bridge is generally considered to be one of the safest types. But the only difference between a self-anchored bridge and an earth-anchored one is the termination of the main cables in the deck, rather than in the earth, thus putting the deck in compression. The anchorage of the cables in the deck is a challenging design problem, but it is not a seismic issue particularly. The seismic forces in the cables are not particularly high. If they can be satisfactorily anchored to carry the dead weight of the bridge, they can easily resist the additional dynamic forces.

Unlike an earth-anchored suspension bridge, there is a theoretical possibility of instability of the deck of a self-anchored suspension bridge, since this is in compression under dead load. But as a practical manner, the factor of safety against this instability is very high, ten or more. This is because the deck and the cables work together as a system; the cables stiffen the deck. And analogously to the main cables, the compression in the deck does not vary much from the dead load compression. There is no practical possibility of the structure becoming unstable.

Professor Astaneh's statement that, "There are no major bridges built using this system and there is no experience and data on seismic performance of such a system," is no reason to reject a self-anchored suspension bridge and prefer another bridge type. Great earthquakes like those used for design of the new bridge occur only infrequently, and bridges have not often been outfitted with instruments to measure their response. There is actually no

measurement at all of the response of a major bridge during a great earthquake. If we insist on having that data before proceeding with a design, we will not be able to build a cable-stayed bridge either, nor even a long span viaduct of the type proposed. Out design will rely on careful analysis, design to conservative criteria, and on the testing of critical components. This is the case with all major bridge designs.

Professor Astaneh's concern about "Supporting the main tower on piles rather than on firm rock," is misguided. "Piles" and "firm rock" are not alternatives to each other, and piles are not necessarily bad. The fact is that the main towers are supported on piles that are in turn founded in firm rock. The piles are not like those commonly seen in building construction, but 10 foot diameter steel shells filled with concrete. These are tough piles, and they will be designed for the maximum forces that can be imposed by the structure above. The design is both seismically safe and economical. The alternative is to carry the main tower itself down to bedrock. This might be a marginally better design, but it would add several tens of millions of dollars to the cost of the bridge. The expense is not warranted, in our opinion.

The joints between the main span and the viaduct structure are certainly difficult design problems, but these problems would exist regardless of the type of bridge selected for the main span. Indeed the joints between adjacent sections of the viaduct are an equally challenging design. At this point in time, we have not developed these designs fully, because they are not a large cost item (in spite of being a difficult design), and because they are not a differentiating factor between bridge types. (It is also impractical to design the joints before the bridge types are selected.)

Again, the design of the decks to span transversely across the gap between them is fairly straightforward, and the details of this have been saved for final design. All of the "weak points" mentioned by Professor Astaneh are just elements of the bridge that require careful attention in final design. These elements will be the subject of critical scrutiny during the 70% of the design process that remains. None of the points raised by Professor Astaneh are differentiating factors that might cause one bridge type to be preferred over another.

We would also like to remind you that this project will continue to be extensively reviewed by a Seismic Safety Peer Review Panel, appointed by Caltrans and consisting of recognized experts in earthquake engineering. This action is a recommendation by the Governor's Board of Inquiry in May of 1990 to provide for an independent seismic safety review for important structures.

The design has been reviewed by EDAP. This panel includes five professors from the University of California, Berkeley, four in engineering and one in seismology. This panel did not express any reservation about the seismic reliability of the proposed design.

STATE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION
ENGINEERING SERVICE CENTER
DIVISION OF STRUCTURES
P. O. BOX 942874
SACRAMENTO, CA 94274-0001

FAX (916) 227-8116
TDD (916) 227-9559

July 8, 1998

Professor Abolhassan Astaneh-Asl,
781 Davis Hall
University of California, Berkeley
Berkeley, CA, 94720-1710

ContractNo.59A0040
04-SF-80-Various
San Francisco-Oakland
Bay Bridge
Br. No. 34-0006

Dear Prof. Astaneh-Asl:

Subject: Seismic Safety Concerns of the San Francisco – Oakland Bay Bridge Design

I would like to extend my sincere appreciation and thanks on behalf of Caltrans and the Metropolitan Transportation Commission (MTC) for the time expended reviewing the 30% Type Selection document.

In your memo, "Concerns on Seismic Safety of the New East Bay Bridge Design," dated June 20, 1998 sent to the MTC commissioners, it states that you have discovered a number of major seismic safety issues based on your "independent and careful study of the seismic safety of the self-anchored suspension bridge" recommended by MTC.

As the Project Manager for this project, I am obligated to address all issues raised regarding seismic safety and integrity of the structure.

Your concerns as stated in the memo are:

- Potential severe damage and possible partial or catastrophic failure of the main span.
- Supporting the main towers on piles instead of firm rock
- Connection of main span to skyway (which in current design may not survive large earthquakes and may result in collapse of the span)
- The performance of two decks separated from each other with more than 50 feet
- The joints connecting the main span to the rest of the bridge

Mr. Imad Abu-Markhieh, the Peer Review coordinator, has left two voice mail messages and an e-mail message at your office and at your home. As of today, however, he has not heard back from you. He has tried to contact you, in order to arrange a date convenient for you to present your findings, issues and concerns to the project seismic safety Peer Review Panel (PRP). The PRP will analyze your concerns and advise the State on the proper way to adequately address these concerns.

At this point we can only state that we believe the proposed design to be seismically reliable, and reasonably economical. We believe the public good would be best served by the speedy approval of this concept, so that final design and construction can proceed on schedule.

Sincerely,

JAMES E. ROBERTS, Director
Engineering Service Center

UNIVERSITY OF CALIFORNIA, BERKELEY

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

Abolhassan Astaneh-Asl, Ph.D., P.E.
Professor and Vice Chair for Undergraduate Affairs
Department of Civil and Environmental Engineering
781 Davis Hall, University of California,
Berkeley, CA 94720-1710

Mr. James E. Roberts, P.E., Director
Engineering Service Center
California Department of Transportation
P.O. Box 942874
Sacramento, CA, 94274-0001

July 24, 1998

Subject: Seismic Safety Problems of the SFOBB

Dear Mr. Roberts:

I have received the attached letter from Caltrans inviting me to attend a meeting of the Peer Review Panel to discuss my concerns regarding seismic safety problems of the "self-anchored" suspension bridge for the East Bay Crossing of the SFOBB. I will not be able to attend this meeting mainly for the following reasons.

The issues that I have raised regarding seismic safety problems of this bridge design cannot be addressed in one meeting or a presentation. A task of this magnitude requires a continuous and comprehensive study. After reviewing the 30% Design Report, submitted to MTC, and finding serious seismic safety flaws, it was my moral and professional obligation to express my concerns about seismic safety problems of this design. In my letter of June 20, 1998 to MTC, I have listed the major areas of seismic safety problems. However, any further participation requires significant amount of my time which I cannot justify without rearranging my current full time duties towards the University of California. Furthermore, I am concerned about the project Peer Review Panel and apparent conflict of interest in its membership.

Any effective and productive participation on my part needs to be independent of all parties involved in the project. Such independence is essential to preserve the integrity and objectivity of my contributions. If Caltrans is interested in my input on seismic safety issues of this bridge, please let me know so I can try to rearrange my schedule and current duties in a way that I will be able to participate in this process effectively.

In the meantime, as a public service, I will continue my efforts in educating public about the seismic safety of the structures including this bridge.

Sincerely,

Abolhassan Astaneh-Asl, Ph.D., P.E., Professor,

cc: S. Heminger, MTC (for distribution to Metropolitan Transportation Commissioners)
V. L. Sels, Director, Caltrans, B. Maroney, Project Manager, Caltrans
J. Penzien, Chair, Caltrans Seismic Advisory Board

Encl.

Since we have not heard back from you, I have set the presentation for:

Date: July 27, 1998
Time: 8 a.m. to 4 p.m.
Place: Caltrans District 4 -- Park View room
111 Grand Avenue, 1 th floor
Oakland, Californi

I am hopeful, that we can work together to resolve your concerns. Please call me at either (510)286-5885 or (916)227- 8867 or call Ade Akinsanya my staff at 916-227-8294 if you have any questions

Sincerely,

Brian N. Maroney

Dr. BRIAN MARONEY, Project Manager

cc: DMulligan - Dist. 04
JERoberts
JAllison
SHeminger - MTC
SHulsebus - Dist.04
AAkinsanya
AEly - T. Y. Lin/Moffatt & Nichol (J V)
RManzanarez - T. Y. Lin/Moffatt & Nichol (J V)
PRP/SAB Members

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-6444
TDD (510) 286-4454

CERTIFIED MAIL

March 25, 1999

Professor Abolhassan Astaneh-Asi
209 Vernal Drive
Alamo, CA 94507-1229

Dear Professor Astaneh-Asi:

I have reviewed your most recent written statements to Chairwoman King of the Metropolitan Transportation Commission's Bay Bridge Design Task Force and others. As the Project Manager and the Principal Engineer for the new spans I feel I have an obligation to respond to your concerns and statements.

First, I continue to regret your decision to not share with the project design team and the Seismic Safety Peer Review Panel your concerns on the MTC recommended bridge design in a detailed manner in a professional environment. My invitation for you to do so from July of 1998 continues to stand. If you have a legitimate concern, I truly wish to understand it. In the absence of clear and specific statements supported with your assumptions and calculations it is difficult to recognize or evaluate your concerns. I will add to this that I believe you should consider the responsibility you have to communicate any safety-related concerns. If at any time you wish to share your concerns to my team please contact me at (510) 286-5891.

Once again, I will take this opportunity to assure you that you can continue to enjoy a high level of confidence in this project due to the quality of the team of practicing bridge engineers with expertise in earthquake engineering who are developing the design package for construction. The design team has experience successfully delivering large bridge projects in California's earthquake country and around the world. The public can develop even more confidence in the project as it is continuously under independent review by a Seismic Safety Peer Review Panel whose membership was determined by the specific seismic related challenges at this bridge site and are recognized experts in their respective fields.

Sincerely,

Brian K Maroney

BRIAN MARONEY, P.E. Dr. Engineering
California Department of Transportation

C Sheminger

March 29, 1999

The Honorable Gray Davis
Governor of the State of California
Office of the Governor
State Capitol Building
Sacramento, CA 95814

Dear Governor Davis:

In the aftermath of the 1989 Loma Prieta earthquake, Governor Deukmejian issued a proclamation that required Caltrans to appoint an independent "peer" panel of engineers experienced in seismic design, to review and approve the design development of important bridge projects. In compliance with that proclamation, Caltrans appointed the undersigned engineers as the Seismic Safety Peer Review Panel for the replacement of the east crossing of the San Francisco-Oakland Bay Bridge.

The purpose of this letter is to inform you that this panel has and will continue to monitor the design development of this project, with particular attention to features that concern and will enhance seismic safety. In this regard, in spite of recent erroneous and misleading statements in the press, please be assured that the design of the replacement bridge is being developed by experienced engineers with careful attention to engineering principles and with diligent regard for seismic safety.

We would be pleased to answer any questions that you may have regarding this project or to furnish additional information, at your request.

Very truly yours,

Joseph P. Nicoletti, Chair
Senior Consultant
URS Greiner Woodward Clyde

I. M. Idriss
Professor
Department of Civil Engineering
University of California at Davis

Gerard F. Fox
Consulting Bridge Engineer

Frieder Seible
Professor and Chair
Department of Structural Engineering
University of California at San Diego

Ben C. Gerwick, Jr.
Chairman of the Board
Ben C. Gerwick, Inc.

cc: The Honorable Willie L. Brown
Mayor, City of San Francisco

The Honorable Ken Bukowski
Vice Mayor, City of Emeryville

Steve Heminger
Metropolitan Transportation Commission

Will Travis
Bay Conservation and Development Commission

James Roberts
Caltrans

SOUTHERN ALIGNMENT

Hennigan / Holmes / BS Task Force

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

May 28, 1999

RECEIVED
JUN 1 - 1999
B. QUAN

The Honorable Willie L. Brown
Mayor
City and County of San Francisco
401 Van Ness Avenue, Room 336
San Francisco, CA 94102

Dear Mayor Brown:

I have been asked to respond to your letter to Governor Gray Davis, dated May 4, 1999, in which you transmitted a report prepared by J. Mueller International (JMI) which evaluated the feasibility and cost of the construction of a bridge on the city proposed modified S-1 alignment.

Caltrans disagrees with the assertion that changing the alignment at this stage will not cause delay to the start of construction. While the report states that there will be no delays, the fact is that more than a year of intense design work has taken place to get us to the 50 percent completion phase. Changing the alignment now will require a duplication of most of that work. It is not possible to use existing information and hold the construction start date if this is done. Apparently the "qualified experts" who wrote the report do not have a grasp of the level of analysis, investigation, and design that must take place for a bridge of this complexity. We do not believe that the report has input from the necessary disciplines, such as expertise in geotechnical site response, geotechnical foundation design, etc, to make statements about how the alignment can change without impact to the schedule at this stage without having the full breadth of knowledge which is required to address the many varied issues related to this bridge.

It should also be pointed out to you that the JMI team was not successful in competing to be the structure designer for this bridge.

Indicative of the quality of this report is the claim that there is extra time in the schedule because longer spans were designed in shorter times. The report states that the other bridges mentioned are design/build projects (meaning that the design is not complete when construction starts). It should be noted that California law requires a complete design before construction can begin. In addition, the bridges mentioned as examples are much less complex and do not carry the same number of lanes as does the Bay Bridge nor are the environmental requirements where these bridges are located as strenuous as in California. It is disheartening that the report would make such a flawed argument.

We believe that the true experts on this bridge are the complete and diverse project team we have assembled. This complete team encompasses the breadth of knowledge in site response, geology, environmental, and design experience in seismic zones to properly tackle this most complex bridge design. A single discipline cannot fully understand and adequately design a new bridge for the east span of the Bay Bridge.

Constructing a bridge on the alignment proposed by the City, the modified S-1 alignment, will not save money. Again, the arguments that propose this are faulty. The premise that the pile configuration in one area of the N-6 alignment can be applied to much of the length for the modified S-1 alignment is a false

assumption. The foundations and pile configurations must be designed for each location based on the site conditions at each of these locations. The change in pile size is a combination of several complex design challenges which must be simultaneously satisfied including thoughtful and careful design of the seismic yielding mechanisms which are scrutinized through an independent and diverse seismic safety peer review panel. The pile configurations for all the piers for the N-6 alignment are based on the seismic response of the structure at the different locations and designing into the structure known, accessible areas where damage will occur which can then be analyzed after a seismic event. Therefore the claim that smaller piles can be used for a southern alignment is misleading and it cannot be accurately stated that this by itself will save $32,637,000.

The report suggested that by merely widening a few foundations by a fraction of a pile diameter the EBMUD outfall structure can be straddled for only $2,862,000 due to increased concrete and reinforcing steel costs. As with other portions of the report, this is erroneous and in fact is a design mistake. The foundations that could straddle the outfall structure require careful consideration and special design. The planning and design alone necessary to begin the task of straddling the outfall would cost millions of dollars. It has been estimated that for the proper surveying necessary to locate the outfall and the inspection and monitoring during structure construction near the outfall would cost tens of millions of dollars.

Unlike other utilities referred to in the report, the outfall structure is very large and cannot be easily repaired if damaged in a seismic event. The outfall structure was constructed in the 1950's and is not a flexible structure. Whereas the new bridge foundations may not experience much displacement, the outfall may very well experience large displacements. If this occurs with the outfall located as suggested in the report, serious damage is likely to occur due to the outfall moving in such close proximity to the non-moving bridge foundations. Much of the East Bay relies on this outfall structure to dispose of sewerage. The loss of this structure would create many more problems, and the appropriate engineering and environmental solution is to relocate the outfall for the modified S-1 alignment.

This report does not provide any meaningful information to adequately evaluate the modified S-1 alignment. The report shows either a lack of experience working with such complex site conditions or was done to fit the budget, and its conclusions are unsubstantiated. I am sorry but this report does not satisfy the State's concerns for delay and costs.

If you or your staff wish to discuss this matter further, please call Denis Mulligan, Toll Bridge Program Manager, at (510) 286-6293.

Sincerely,

Harry V. Yahata

HARRY V. YAHATA
District Director

C: SHeminger - MTC

EAST BAY BRIDGE
MODIFIED S-1 ALIGNMENT
STRUCTURE EVALUATION

prepared for the

City and County of San Francisco

by

655 University Avenue • Suite 255 • Sacramento, CA 95825
Phone: (916) 929-4143 • Fax: (916) 929-2742

1 Executive Summary

At the request of the City and County of San Francisco, J. Muller International has evaluated the structural implications of an alternative southern alignment for the replacement of the East Bay Bridge. The basic intent of this evaluation is to utilize the bridge plans developed by Caltrans for the northerly alignment, and investigate the feasibility of moving that bridge to the south of the existing bridge. The major structural bridge design differences between the alignments are identified and discussed, with estimated costs impacts summarized. Impacts to the design schedule are also evaluated.

The alignment under consideration is similar to the S-1 alignment in the San Francisco-Oakland Bay Bridge (SFOBB) East Span Draft Environmental Impact Statement (Draft EIS). The alignment studied here is a variation of S-1 developed by Korve Engineering for the City of San Francisco, and is referred to in this report as the Modified S-1 alignment or the southern alignment. Although there are very compelling reasons to study this alignment as an equal with the other three alignments in the Draft EIS, Caltrans deleted the S-1 for a somewhat unusual reason from a structural engineering standpoint.

The primary reason given for not including this alignment is based on a conflict with a non-hazardous utility near the Oakland shore. Although utility conflicts and subsequent utility relocation or accommodation are common occurrences with bridge projects, in this case the presence of a utility is cited as the reason to abandon a very good alignment alternative. No attempt to independently verify the cost associated with relocating this utility is presented in the DEIS, nor is there any evidence that studies were done to assess the options for protecting the utility in place. This report presents an option for accommodating the utility in place.

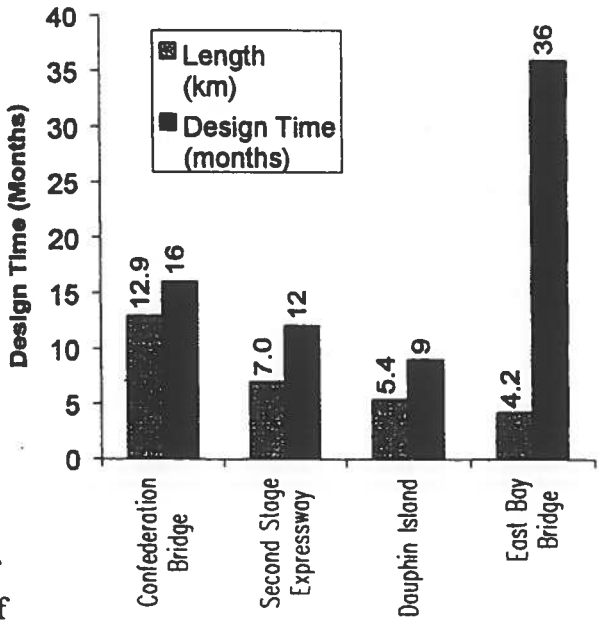
Three other engineering features that define the differences between the two alignments are also studied. These features are the impact to the Main Bridge foundations, the effect of the deep bay mud and the overall shorter alignment for the bridge. This study shows that from engineering and construction cost considerations, the southern alignment is superior to the current north alignment of the bridge. In fact, a total savings of over $58 million can be realized with the relocation of the bridge to the Modified S-1 alignment.

The following table summarizes costs associated with the four most significant structural issues associated with moving the bridge to the southern alignment. Other non-structural impacts are associated with a change in the alignment. Although non-structural issues are outside the scope of this report, budget and schedule facts are discussed and presented in this report to put the conclusions into perspective within the overall project.

Cost Savings of Modified S-1 Alignment	
Item with Cost Impact	**Savings or (Cost)**
Length of Structure	$29,607,000
Tower and Anchor Pier Locations	
Pier W2	$198,000
Main Pier	($18,830,000)
Bay Mud Characteristics	
Change pile group	$32,637,000
Reduce length	$5,310,000
Utility Conflicts	
EBMUD Sewer Outfall	($2,862,000)
Sub-Total	**$45,862,000**
Contingencies (25%)	$11,466,000
TOTAL SAVINGS	**$57,328,000**

Minimal impacts to the current replacement schedule result from moving the bridge to the southern alignment, if the decision to relocate is made at this time. The bridge should be realigned immediately to the Modified S-1 alignment to maximize the savings in time and budget. Any further delay of the move will only result in more at-risk design dollars being spent on alignment specific design, and further delay may soon begin to jeopardize the delivery schedule.

The current schedule can be maintained for delivery of design by the end of 2000. Although Caltrans is claiming 50% completion of design, the level of detail shown on the plans can be considered a skeletal layout at best. There are no in-depth details, so only adjustments of the plans for changes in alignment and profile are needed. Because there is not a high level of detail, most of the current plans can be salvaged, and all of the analytical work is easily adapted to a new alignment. All re-work of the plans can be done within the timeframe currently established for design of the bridge.



To put the schedule issue into perspective, a comparison to other large bridge projects and design delivery schedules is helpful. Samples of other large bridge projects are compared for the length of the bridge and the design schedule. As the chart illustrates, the time scheduled by Caltrans to design the East Bay Bridge is somewhat out of proportion with recent design schedules of

other long bridges. These bridges are described in more detail in the report. Fortunately, this extra time built into the East Bay Bridge design schedule gives Caltrans the flexibility to move the bridge to the better southern alignment without jeopardizing the delivery schedule.

There are some common misconceptions about the amount of prior design work that will be lost if the alignment is moved to a new location. Most of the plans developed to date are not of sufficient detail as to render them useless if the alignment changes. The plans can be adapted in a very efficient manner, since they are mostly conceptual type drawings that do not contain a high level of detail. A summary of the changes needed for each plan is shown in the Appendix. The analytical models that have been developed are also easily changed, it is simply a matter of adjusting the input data to the new alignment; the engineers will not throw out the current models to start again from scratch. All of these plan changes and analytical model changes may produce an initial delay, but there will be ample opportunity to make up the lost time since there is no learning curve to overcome to get the plans back to the 45% completion level. Also, there is more opportunity for duplication of details on the Modified S-1 alignment, as the geometry is simpler on a tangent (straight) bridge. This can only help to accelerate the delivery schedule, another benefit of the Modified S-1 alignment.

Another factor often cited as a reason to not move the bridge, is the fact that all of the deep soil borings in the bay have been taken on the north side of the existing bridge. Critics claim that without soils information from borings taken precisely on the bridge alignment, the bridge design cannot move forward. This is simply not true. As of the date of this report, Caltrans is unable to produce recent detailed geotechnical information for San Francisco to evaluate. However, the current design has been moving forward, which confirms that sufficient geotechnical information exists in the earlier records to produce the 45% design.

The Modified S-1 alignment is, at most, about 300 meters south of the N-6 alignment, or just under two Skyway span lengths away from N-6. The differences in soil properties expected to be encountered between the north and south alignments will be no greater than what is found between every other span of the current north alignment. Because there are several existing studies and borings to rely on for good geotechnical information south of the existing bridge, similar procedures that Caltrans used to develop foundation properties for the north alignment can be used for the south. It is assumed that as the existing soil boring program yields more detailed information about the engineering properties of the soils on the N-6 alignment, that information will be incorporated into the final design for verification. A similar approach is anticipated for the design of the bridge on the Modified S-1 alignment, and therefore will not cause a schedule delay.

The Skyway Structure is the bridge that will be affected most by a change in subsurface conditions. The design of this bridge can proceed with less than perfect soil information

because, fortunately, Caltrans design practices ensure that the earthquake response of a bridge be acceptable over a large range of input motion. This is because Caltrans has learned from experience that the exact nature of the seismic input motion depends on many variables, including localized variations in the foundation soil properties. The Skyway Structure is designed to accommodate all ranges of motion expected along the 2km of bay mud it currently spans, as evidenced by the uniform design of the foundations for the bridge. If the bridge were sensitive to and dependent on the exact depth of all mud layers, every foundation would look different since the soil layers are definitely not uniform over the length of the bridge.

Therefore, any claim of delay due to rework of a "50%-designed" bridge and "unknown" soil conditions needs to be questioned, especially the popular claims of years of additional work due to a move of the alignment.

It is clear from this study that moving the bridge to a south alignment will be cost effective, saving money even considering the loss of part of the design and geotechnical work Caltrans has already put at-risk. The schedule can be maintained to deliver plans at the end of 2000, and ultimately may shave years off of the schedule if making the move improves the chances that the environmental document can be approved.

2 General Features of Proposed East Bay Bridge Replacement

The replacement structure, as presented in the preliminary plans developed by Caltrans, is based on the assumption that the N-6 alignment will prevail as the preferred alignment once the environmental process is completed. This layout is presented in Figure 1, which shows the Project Alternatives as presented in the Draft EIS. The bridge is comprised of four distinct bridge types as the alignment crosses the San Francisco Bay.

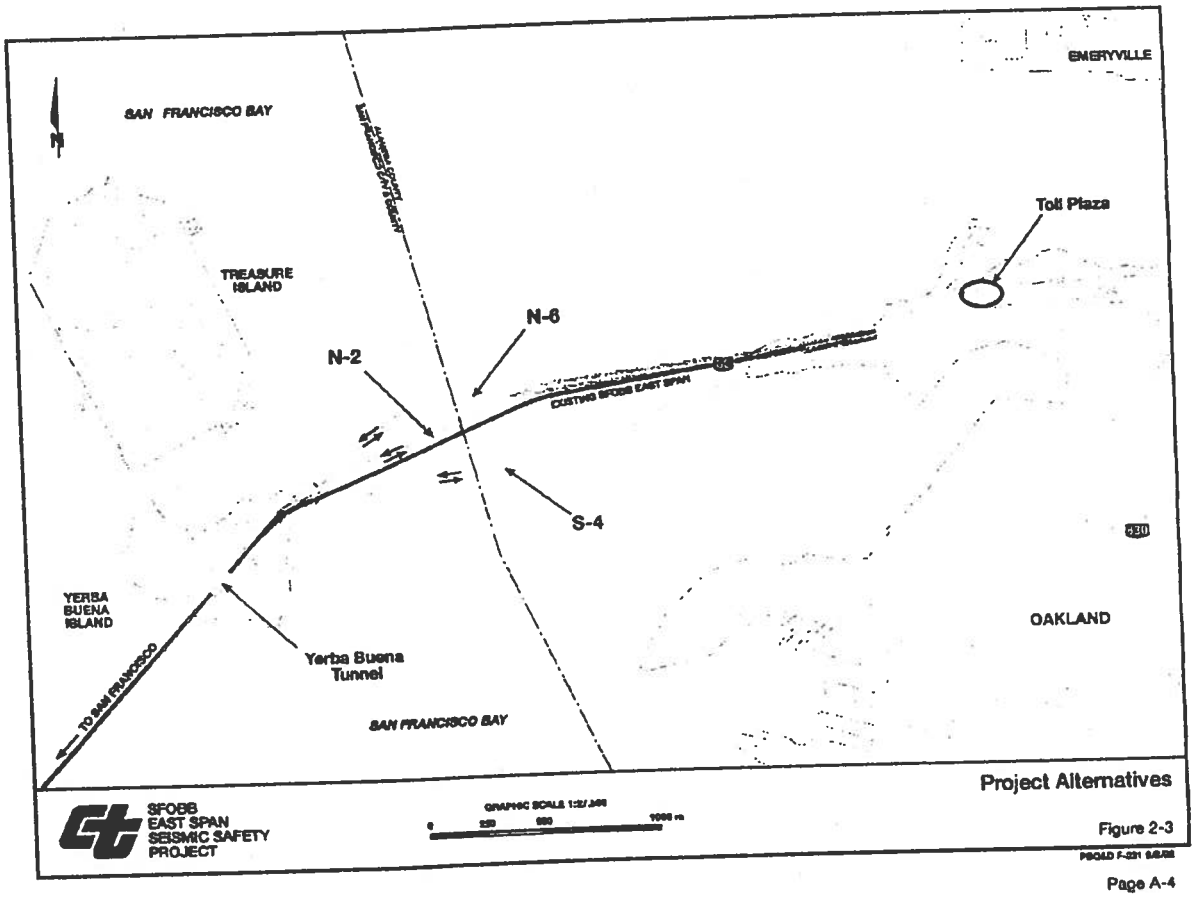


Figure 1: Alternative Alignments from Draft EIS

The project begins with the Yerba Buena Island Transition structure, which is generally described as the segment of bridge that connects the double level tunnel on the island to the back span of the Main Bridge, where the roadways are side-by-side. This structure is highly constrained by the requirement to meet the existing tunnel alignment, and will widen and separate each roadbed to meet the end of the main span. These bridges will have several "outrigger" or straddle type bents that are commonly used by bridge designers to straddle over conflicting facilities under the bridge.

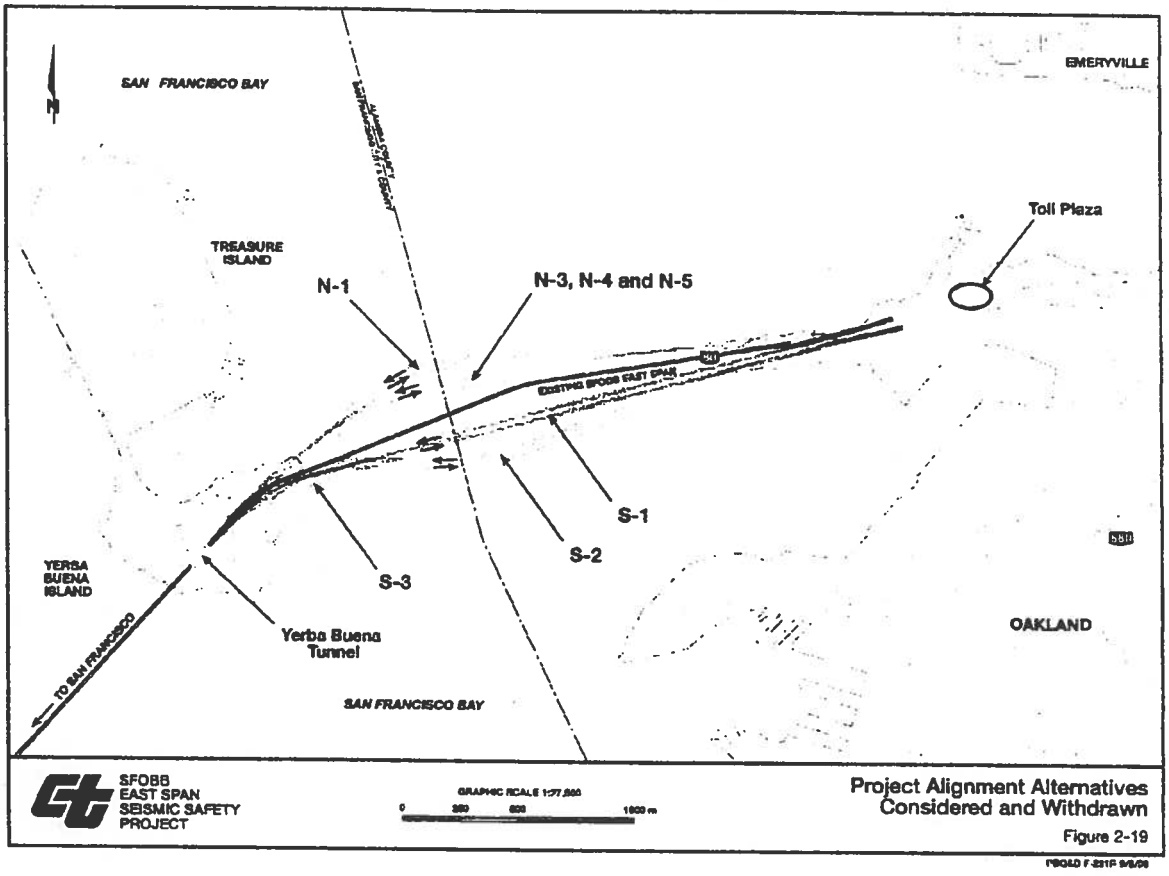
The "Main Span Structure" then bridges between the end of the Transition Structure on the island and the "Skyway Structures" in the bay. The Transition Structure is founded on the rock of the island and the Skyway is founded in the bay mud. The Main Bridge is the so called "signature structure", a self anchored suspension bridge with a single tower founded on piles extended from an outcropping of rock off the north tip of the island. The extended suspension span of 385 meters greatly exceeds the preferred Coast Guard Clearance requirement of 153 meters. The back span of the Main Span contains a massive counterweight attached to an anchor pier embedded into a deep hillside excavation on the tip of the island. The other end of the main span is post tensioned down to an anchor pier, founded on large diameter piles. The far end of the main span of the suspension bridge cantilevers over the anchor pier to meet the Skyway Bridge at a mid-span hinge.

The Skyway Structures are comprised of pre-cast segmental concrete box girder superstructures supported by concrete piers founded on large 2.5-meter diameter piles driven to a depth of 100 meters. As the Skyway approaches the Oakland shoreline, the piles are reduced to 1.5-meter diameter.

Just off the Oakland shoreline, the Oakland Approach Structure carries the roadbed over approximately 500 meters of the shoreline. It then touches down at a point where the roadway fill needed over the soft bay mud on the shoreline of the Oakland Spit becomes acceptable. The majority of the Oakland Approach Structure is typical cast-in-place concrete box girder construction, with the segments over and along the Oakland shoreline shown as a reinforced concrete slab on pile extensions.

2.1 DESCRIPTION OF N-6 ALIGNMENT

The current plans developed by Caltrans for the replacement bridge follows the N-6 alignment. The N-6 alignment is one of six different alignments considered by Caltrans on the north side of the existing bridge. The Draft EIS was developed using only two north alignments, the other four being rejected for various structural and traffic operation concerns. The four north alignments rejected from study can be seen in Figure 2, taken from the Draft EIS.



Page A-50

Figure 2: Alternative Alignments Rejected for Study in Draft EIS

2.2 DESCRIPTION OF MODIFIED S-1 ALIGNMENT

The S-1 alignment is presented in the Draft EIS as an alignment considered and withdrawn from further study. The City of San Francisco, however, recognizes that this may in fact be a more suitable alignment for the replacement bridge. This alignment is one of three withdrawn from study to the south of the existing bridge, as can be seen in Figure 2, a diagram of the rejected alignments from the draft EIS.

Korve Engineers has developed a Modified S-1 alignment for the City of San Francisco. It is based on the Caltrans S-1 alignment, with improvements to roadway geometry to meet all Caltrans standards. This alignment is used as the basis for this study, and references in this study to the southern or the Modified S-1 alignment are referring to this improved S-1 alignment.

3 Comparison of the N-6 and Modified S-1 Alignments

The structural related differences between these two alignments are summarized in four distinct issues:

- Overall bridge length.
- Tower and anchor pier locations.
- Bay mud characteristics.
- Utility conflicts.

These issues are discussed using the 45% Unchecked Details design drawings delivered by Caltrans on February 19, 1999, as well as the cost estimate delivered February 12, 1999, shown in the Appendix. All comparisons are made on the assumption that the bridge as currently designed will not change, only the factors dependent on the alignment selection will be studied. Therefore, all cost figures will be based on the Caltrans estimate to ensure fair comparisons of the relative changes in quantities.

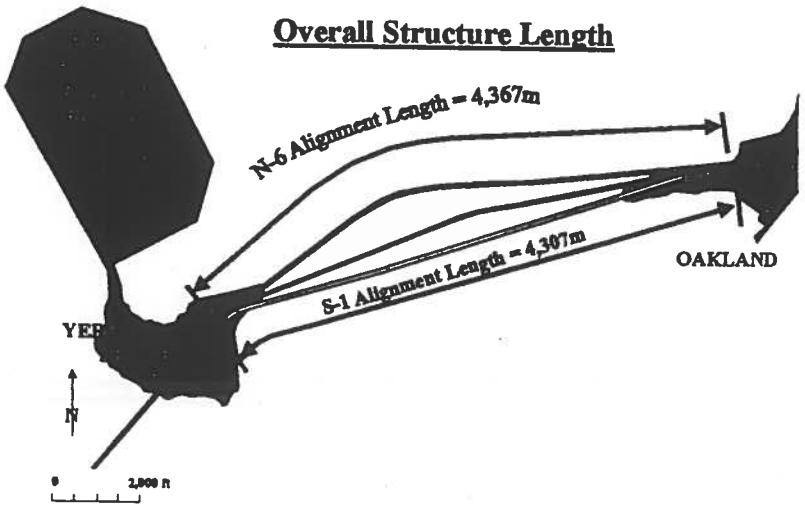
3.1 OVERALL BRIDGE LENGTH

The southern alignment (Modified S-1) is a direct route between Oakland and Yerba Buena Island, whereas the northern alignment (N-6) sweeps north of the existing structure. As a result the overall bridge length of the southern alignment is shorter by an estimated 60-meters.

The bridge as discussed earlier is composed of four separate structure types:

- Yerba Buena Island Transition Structure
- Main Span Structure
- Skyway Structure
- Oakland Approach Structure

The factors affecting the length of each of these bridge segments include overall alignment, location of the Main Span structure and the pier configuration of the Skyway structure. For the purpose of this analysis, the existing lengths of the Main Spans are maintained and the typical Skyway span length has been maintained.



3.1.1 Yerba Buena Island Transition Structure

The Yerba Buena Island Transition Structure consists of two mainline structures (eastbound and westbound) and an eastbound ramp. The total structure length is approximately 1.0 km. The mainline structures are 25.07-meters wide and the ramp structure is 14.17-meters wide, both structures are cast-in-place prestressed concrete box girders. As this is the transition from the tunnel to the main span, the approach structures are supported by a variety of cantilever piers and portal frames.

The Modified S-1 alignment is assumed to have basically the same span configuration, pier configuration and construction method as that of the N-6 alignment, although Korve has determined that the temporary detours will be simpler and less costly for the Modified S-1 alignment. As the Main Span structure is moved out to the end of the curve, the overall length of the transition structure is expected to increase by approximately 60 meters (one span). The increase occurs at the eastern end of the transition structure where the bridge decks have already separated, away from the more complex substructure.

3.1.2 Main Span Structure

For the N-6 alignment, the Main Span Structure overall length is 675-meters, and the span configuration and overall structure length is unchanged on the Modified S-1 alignment. Impacts associated with relocation of the main span are examined in detail elsewhere.

3.1.3 Skyway Structure

The N-6 alignment Skyway Structure is 2002-meters long, with the span configuration as shown in the table below. The skyway is composed of two parallel structures. Each structure has a width of 25.07-meters and is constructed in the precast balanced-cantilever method.

For the southern alignment, the overall structure length is decreased by 160-meters, or one typical span length. The structure type of the northern alignment is maintained in the design of the southern alignment. The span configuration of the southern alignment is also shown in the table below.

Span	Northern Alignment Span Configuration (meters)	Southern Alignment Span Configuration (meters)
E3	80	80
E4	160	160
E5	160	160
E6	160	160
E7	160	160
E8	160	160
E9	160	160
E10	160	160
E11	160	152
E12	152	136
E13	136	120
E14	120	104
E15	104	88
E16	88	42
E17	42	NA
TOTAL	**2,002**	**1,842**

Summary of Skyway Span Layout

3.1.4 Oakland Approach Structure

The Oakland Approach Structure consists of two mainline structures (eastbound and westbound). The structure consists of approximately 920-meters of a cast-in-place prestressed concrete box girder (structure width of 25.07-meters) and approximately 406-meters of reinforced concrete slab. The concrete slab is used to support the westbound roadway as is skirts over the northern shoreline of the peninsula.

The southern alignment is assumed to have basically the same span configuration as the north alignment, however, the approach span must extend an additional 40-meters into the bay to match with the skyway structure. Thus the overall length of the Oakland Approach structure is increased by 40-meters (one span).

Note that because the landing of the southern alignment is closer to the center of the peninsula, there is no need for the 402-meters of the reinforced concrete slab. Elimination of this slab bridge saves the cost of driving some 250 prestressed concrete piles, as well as 5300 sq. meters of reinforced concrete slab.

	Change due to Southern Alignment	Structure Width	Change in Deck Area
Yerba Buena Island Transition Structure	Increase eastern end of approach by 60-meters	Two structures each 25.07m	Increase of 3,008 m^2
Main Span Structure	No change	-	-
Skyway Structure	Decrease in structure length by 160-meters	Two structures each 25.07m	Decrease of 8,022 m^2
Oakland Approach Structure	Increase in western end of approach by 40-meters	Two structures each 25.07m	Increase of 2,006 m^2
Oakland Approach Slab Bridge	Eliminate	Varies	Decrease of 5300 m^2

Summary of Changes in Structure Length

3.1.5 Cost Savings Analysis Due to Structure Length

Shortening the structure results in savings of superstructure and substructure piers and pilings. It is common practice to estimate the cost of a bridge based on the deck area. As such, the savings associated with the reduced structure length can be estimated by determining the corresponding reduced deck area and the average deck area cost. The average deck area cost shown on the Caltrans estimate will be used for this comparison.

	Change in Deck Area (m^2)	Cost ($/$m^2$)	Cost Savings (Increase)
Yerba Buena Island Transition Structure	3008 Increase	2628	($7,905,000)
Main Span Structure	No change	-	-
Skyway Structure	8022 Decrease	4608	$36,965,000
Oakland Approach Structure	2006 Increase	1577	($3,163,000)
Oakland Approach Slab Bridge	5300 Decrease	700(est)	$3,710,000
Total Savings			$29,418,000

Summary of Cost Savings Due To Change in Structure Length

3.2 TOWER AND ANCHOR PIER LOCATIONS

The southern alignment requires a relocation of the Main Span Structure. Any change in the location of the Main Span Structure will have an impact on the cost of the bridge. The design of the Main Span superstructure is basically unchanged; the impact is primarily with the foundations. For purposes of this study the foundation stiffness will be

maintained to minimize changes in the overall structure behavior. The substructure impacts are as follows:

3.2.1 Impact on West Pier - W2

The northern alignment locates the west pier in the hill located on the eastern peninsula of Yerba Buena Island adjacent to the Torpedo House. A large portion of the hill will be excavated in order to allow for the pile cap to be situated with a bottom of footing elevation of +5.00 MSL as specified in the plans. This results in rock excavations as deep as 18-meters, with an estimated total removal of 21,860 m^3 of rock from the hill. Once the pier is constructed, the hill will be rebuilt using 12,130 m^3 of structural backfill. For the northern alignment the pier height of W2 is 42.25-meters.

The southern alignment locates Pier W2 on the shoreline, behind the cable house. To allow for the access road to the Torpedo House, the top of W2 pile cap will have to be placed at an elevation of +3.0 MSL, thus the bottom of footing elevation will be –2.00 MSL. This will extend the pier height of W2 to 49.25-meters.

Contract Item – Structural Concrete Bridge

As a result of the relocation, the height of pier W2 will increase from 42.25-meters to 49.25 meters. The change in concrete quantities associated with this revision is as follows:

Northern Alignment	Southern Alignment
Pier height = 42.25 m Area of pier = 36.63 m^2 Number of piers = 2 Total Concrete Volume = 3,095m^3	Pier height = 49.25m Area of pier = 36.63 m^2 Number of piers = 2 Total Concrete Volume = 3,608m^3

Total increase in concrete volume = 513 m^3.

Contract Item – Bar Reinforcing Steel

With an increase in pier height, there will also be an increase in reinforcement. The Caltrans cost estimate shows a quantity of 1,430,000 kg of reinforcing steel and 5,370 m^3 of concrete. This works out to a reinforcement ratio of 266 kg per m^3.

To determine the reinforcement associated with the increase in pier height, the increase of concrete will be multiplied by the same reinforcement ratio. Thus the total reinforcing quantity works out to be:

Reinforcing steel = 1,430,000 + 513 m^3 * 266 kg per m^3
= 1,430,000 + 136,460 kg.
= 1,566,460 kg

Note that as the pier is now in the water all reinforcement will be assumed to be epoxy coated, so allowances are made in the comparison to change all rebar from non-coated to epoxy coated. This is shown as a deduction for the total non-coated reinforcement and as a cost for the total epoxy coated reinforcement.

Contract Item – Prestressing

The Caltrans cost estimate did not account for the prestressing associated with pier W2. For the purpose of this report a quantity estimate will be made for both the northern and southern alignment.

Northern Alignment	Southern Alignment
2 piers 30 tendons per pier 31 strands per tendon each strand 62 m long strand is 1.101 kg/m total = 127,000 kg	2 piers 30 tendons per pier 31 strands per tendon each strand 69 m long strand is 1.101 kg/m total = 141,300 kg

Contract Item – Structural Excavation D & H

The Caltrans cost estimates anticipates 8,000m^3 of excavation, this is in error (low) as the pile cap is placed as much as 18 meters below the top of the hill, and the volume of the pile cap alone is 6,386m^3. The actual quantity of excavation is calculated to be 21,160m^3 total, with the majority assumed to be in rock. For comparison purposes, a weighted average unit price of 104 \$/m^3 for structure excavation in this rock will be used for both alignments.

The cost impact of relocation of Pier W2

CONTRACT ITEM	Unit Price	Northern Alignment		Southern Alignment		Savings (Increase)
		Quantity	Amount	Quantity	Amount	
Structural Concrete Bridge - m^3	\$600	3,095	\$1,857,000	3,608	\$2,164,800	(\$307,800)
Bar Reinforcing Steel (Bridge) – kg	\$1.20	1,430,000	\$1,716,000	-	-	\$1,716,000
Bar Reinforcing Steel (Epoxy Coated) – kg	\$2.00	-	-	1,566,460	\$3,133,000	(\$3,133,000)
Prestressing – Footing and pier – kg	\$5.50	127,000	\$698,500	141,300	\$777,150	(\$79,000)
Structure Excavation,m^3	\$104	21,160	\$2,201,000	6,000	\$624,000	\$1,577,000
Structure Backfill, m^3	\$40	12,130	\$485,200	1,500	\$60,000	\$425,000
Total Savings						**\$198,000**

3.2.2 Impact on East Pier – E2

The southern alignment has a more favorable soil condition, when compared to the northern alignment, as discussed elsewhere. Therefore, savings in foundation cost can be made here, but in the interest of maintaining an equivalent anchorage mass; no change of this pier is anticipated.

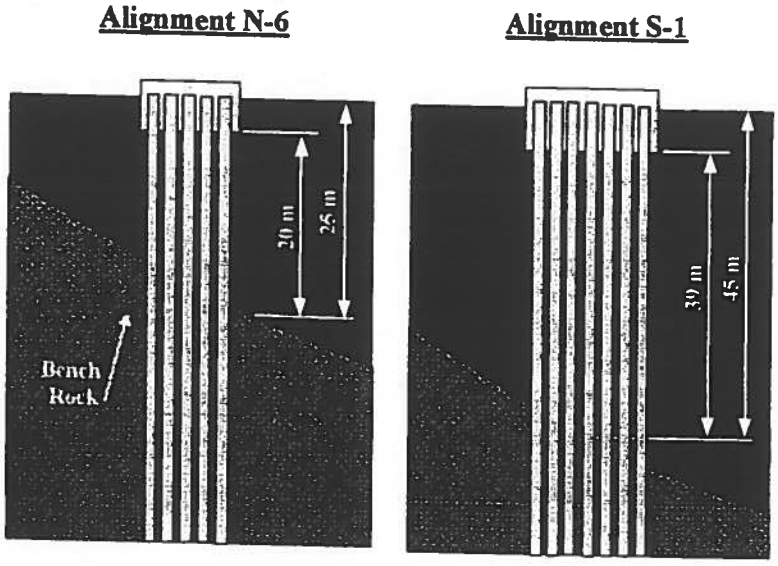
3.2.3 Impact on Main Pier

With regard to the main pier, the major impact of relocation is associated with the foundation design. The northern alignment anchors the tower piles in rock located at elevation –25.0 MSL. The southern alignment will result in the piles being founded in rock at elevation –45.0 MSL. To minimize the impact on the superstructure, the pile layout was reconfigured in order to maintain the same stiffness as that of the original design.

Contract Item – CISS Conc. Piling 2.5m (w/ perm casing)

Tower Pier Foundation

To match lateral stiffness, the foundation for the southern alignment will require 30 piles, 14 more then that of the northern alignment. Since the piles are founded deeper than that of the northern alignment, the pile unsupported pile length will increase an additional 20 meters.



N-6 Alignment	Modified S-1 Alignment
16 piles Each pile is 51m in length Total length of piles = 16*51 = 816 m	30 piles Each pile is 71m in length Total length of piles = 30*71 = 2,130 m

Contract Item – Structural Concrete Bridge

With in increase of piles, the pile cap size will also increase. The N-6 alignment pile cap requires 3,590m^3 of concrete. For the Modified S-1 alignment, it is anticipated that the pile cap will require 10,744m^3, an increase of 7,154m^3.

Contract Item – Bar Reinforcing Steel

With an increase in pile cap concrete, there will also be an increase in reinforcement. The 30% cost estimate assumed a quantity of 1,850,000 kg of reinforcing steel for 3,590m^3 of concrete. This works out to a reinforcement ratio of 515 kg per m^3.

To determine the reinforcement associated with the increase concrete, the concrete of the Modified S-1 pile cap will be multiplied by the same reinforcement ratio. Thus the total reinforcing quantity works out to be:

Reinforcing steel = 10,744m^3 * 515 kg per m^3
= 5,533,160 kg.

Contract Item – Structural Excavation = Type D

Because of the short pile lengths associated with the northern alignment, it is necessary to level the rock in which the piles are founded. In this manner, each of the piles will have the same flexibility. If the piles had widely differing flexibility, the distribution of loads to the piles would be unbalanced (stiffer piles taking more loads). For the southern alignment, it will not be necessary to level the rock. The pile lengths are sufficiently long that the changes in the rock contour will have only a minimal effect on the pile flexibility.

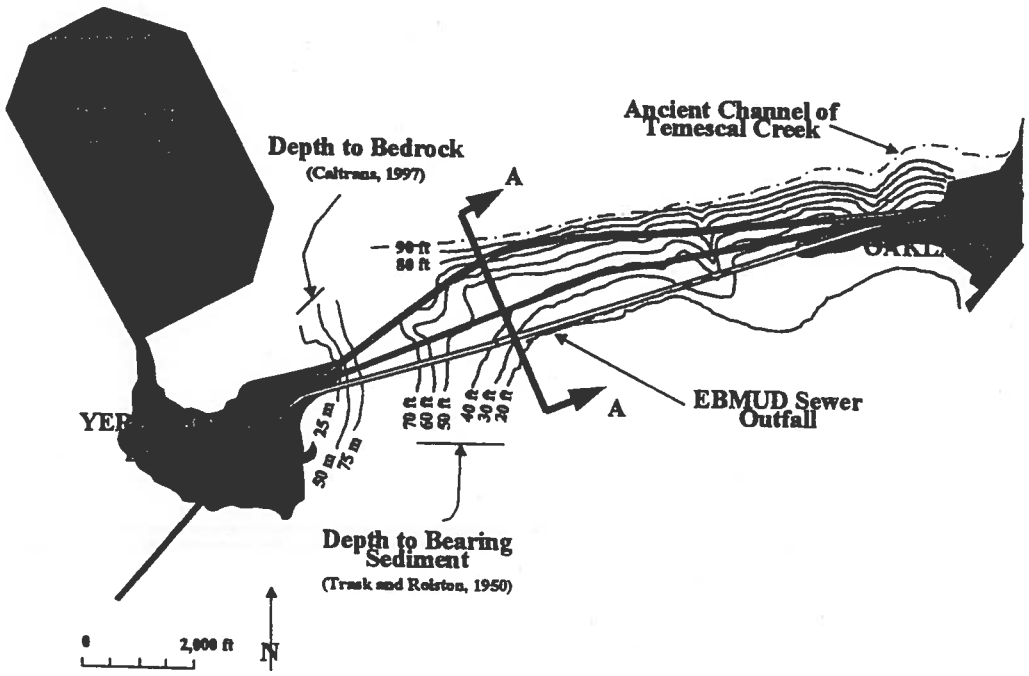
Therefore, no underwater excavation is needed on the Modified S-1 Alignment, and the quantity for structure excavation is deleted. Also, since there is less slope to the rock shelf on the southern alignment, the allowance in the estimate for the item 'North Slope Stabilization" is deleted as well.

The cost impact of relocation of Tower Pier

CONTRACT ITEM	Unit Price	Northern Alignment		Southern Alignment		Savings (Increase)
		Quantity	Amount	Quantity	Amount	
CIDH Conc. Piles 2.5m (w/ perm casing)	$7,700	816	$6,283,000	2,130	$16,401,000	($10,118,000)
Structural Concrete Bridge - m^3	$490	4,147	$2,032,000	10,744	$5,265,000	($3,233,000)
Bar Reinforcing Steel (Epoxy Coated) – kg	$2.00	2,137,000	$4,274,000	5,533,160	$11,066,000	($6,792,000)
Structural Excavation – Type D - m^3	$52	30,000	$1,560,000	None	-	$1,560,000
North Slope Stabilization			$600,000	None	-	$600,000
Total Savings (Increase)						**($17,983,000)**

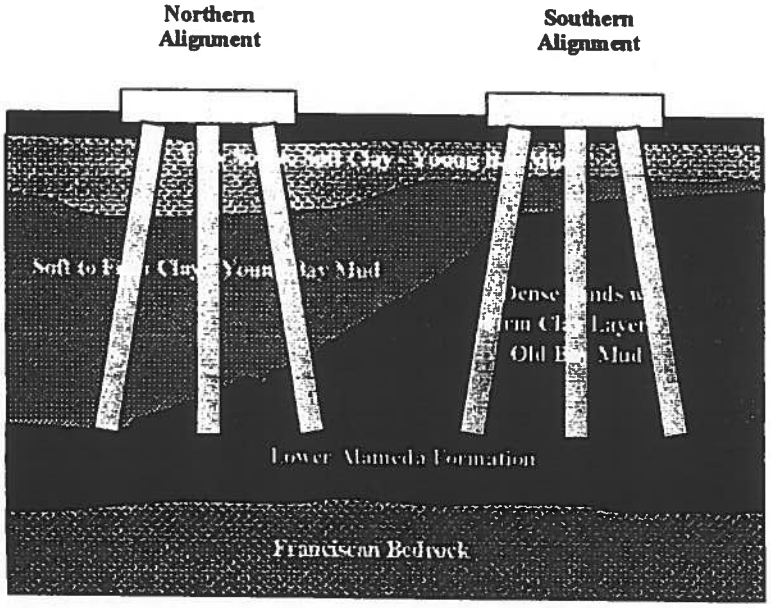
3.3 BAY MUD CHARACTERISTICS

This is the feature of the Modified S-1 alignment that is significant enough alone to justify the claim that the Modified S-1 is the best alignment for this bridge. The reasons why Modified S-1 is a superior alignment can be found in the Draft EIS, where arguments for discarding other north alignments are made. As Caltrans explains in Section 2.7 of the Draft EIS, the unacceptable Young Bay Mud layers are significantly



deeper to the north of the existing bridge, as they fill in an ancient creek channel feature that runs essentially East-West, parallel to and just north of the existing bridge.

As can be seen from Section A-A below, the Modified S-1 alignment completely avoids this undesirable underwater feature. Along both alignments, the piles must extend



through the Young Bay Mud, prior to reaching load-bearing sediment. The ancient channel of the Temescal Creek defines the depth to the initial load bearing sediment and therefore the depth of Young Bay Mud. The Young Bay Mud is characterized as having no useful engineering properties. The further away from the channel, the shallower the depth of the Young Bay Mud. The ancient channel of the Temescal Creek runs just north of the northern alignment. At the northern alignment, the piles must extend through an additional 6 to 17 meters of Young Bay Mud prior to embedment into the load bearing soils.

The Modified S-1 alignment is at the most about 300 meters south of the N-6 alignment, or just under two Skyway span lengths away from the N-6 alignment. There are several studies and borings to rely on for good geotechnical information in this area. For example, the Caltrans report "Geologic Issues for the Proposed New East Span of the San Francisco – Oakland Bay Bridge", dated August of 1997 summarized the findings, in part, as follows:

"...Interpretation of the borehole data indicates there is a buried channel (ancient Temescal Creek) north of, and parallel to, the existing bridge alignment. This ancient channel has been filled in with Young Bay Mud. The direction of the trough of Young

Bay Mud is subparallel to, and in general proximity to, the North Extended Alignment. The deeper and thicker soft Young Bay Mud will likely require deeper foundations in these areas and will likely amplify ground motions during a seismic event...There is less variability in the thickness of Young Bay Mud along and between the existing and Southern alignments..." (Page 7).

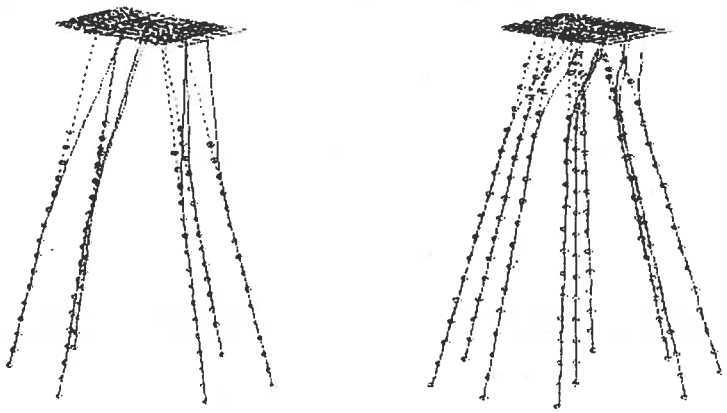
So basically, the conclusion of Caltrans in August 1997 was to go south with the alignment. This conclusion is confirmed in the Draft EIS as the reason for rejecting the N-1 alignment, as Caltrans states there:

"...it was determined that that approximately one-half of the N-1 alignment would fall within areas of deep Young Bay mud, increasing the complexity, schedule, and cost of constructing the bridge substructure while potentially reducing seismic performance..." Section 2.7.1.

By keeping the pile foundations in the better supporting soils to the south of the existing bridge, smaller piles can be utilized while maintaining equivalent foundation stiffness This is illustrated very clearly by looking at the 45% plans of the bridge. As the Skyway Structure approaches the Oakland Shore, the foundations move out of the deep Young Bay Mud and into conditions similar to the southern alignment. At Pier E14, the pile group changes from six-2.5-meter piles to nine 1.5-meter piles. This is due in part to the shorter span lengths near the Oakland shore, but is mostly controlled by lateral stiffness improvement in the underlying soil profile, a profile very similar to all of the Modified S-1 Alignment.

Examples of the two pile groups were compared for compatibility of lateral deflection characteristics and vertical capacity. The analysis shows that the nine 1.5-meter pile

The Southern Alignment Offers an Opportunity For More Efficient Foundations



Six-Pile Group
2.5 m Diameter Piles
Northern Alignment

Nine-Pile Group
1.5 m Diameter Piles
Southern Alignment

group can provide more than enough stiffness to replace the six 2.5 meter pile group. Therefore, the Modified S-1 alignment cost is estimated using the nine 1.5-meter piles at all piers on the Skyway Structure.

	Northern Alignment		Southern Alignment	
Pile Group:	2.5m, Tot 6	1.5m, Tot 9	2.5m, Tot 6	1.5m, Tot 9
Transverse (kN/m)	**101,030**	35,497	477,595	**187,627**
Longitudinal (kN/m)	**86,124**	33,250	375,253	**164,173**

Comparison of Pile Group Stiffness for Each Alignment

As for the pile length, current design shows the pile length to be approximately the same for each size pile group, indicating that the pile lengths are intended to be driven into the Lower Alameda Formation. However, Caltrans is currently evaluating this situation, and is in the process of doing a pile driving and load capacity test to fine-tune the pile length recommendations. The end result of this study will likely be a reduction in pile length, where the skin friction of the Upper Alameda Formations will supply adequate support for the bridge, as it has for the existing bridge for the last 60 years. The Modified S-1 alignment cost calculation anticipates this expected reduction in pile length, and calculates the savings based on the fact that the Young Bay Mud layer is much less on the Modified S-1 alignment.

3.3.1 Cost Impact of Young Bay Mud Depth

The following table shows the savings that can be achieved with the better soils. The price for each Modified S-1 alignment pile group is just 54% of the N-6 pile group. This is calculated as simply a reduction in quantity due to the smaller diameter, and an increase due to more piles per footing.

$$\text{Adjustment of pile quantities} = \left(\frac{1.5^2}{2.5^2}\right)\left(\frac{9}{6}\right) = 54\%$$

Pier	N-6 Alignment Total Pile Length Each Pier (meter)	Unit Cost, $/meter	N-6 Alignment Cost	S-1 Alignment Cost (54%)	S-1 Alignment Savings
E3	1,224	$5,500	$6,732,000	$3,635,280	$3,096,720
E4	1,176	$5,500	$6,468,000	$3,492,720	$2,975,280
E5	1,200	$5,500	$6,600,000	$3,564,000	$3,036,000
E6	1,170	$5,500	$6,435,000	$3,474,900	$2,960,100
E7	1,134	$5,500	$6,237,000	$3,367,980	$2,869,020
E8	1,188	$5,500	$6,534,000	$3,528,360	$3,005,640
E9	1,164	$5,500	$6,402,000	$3,457,080	$2,944,920
E10	1,164	$5,500	$6,402,000	$3,457,080	$2,944,920
E11	1,164	$5,500	$6,402,000	$3,457,080	$2,944,920
E12	1,176	$5,500	$6,468,000	$3,492,720	$2,975,280
E13	1,140	$5,500	$6,270,000	$3,385,800	$2,884,200
Total Savings	**12,900**	**$5,500**	**$70,950,000**	**$38,313,000**	**$32,637,000**

Summary of Savings Due to Pile Group Change

Notice that only the "furnish pile" quantities are adjusted. There will also be a corresponding reduction in the drive pile cost, but since that item is not well defined in the estimate, that savings will be ignored, as it is considered to be minor compared to the other quantities.

If the design approach for the piles were revised, accounting for skin friction found in the San Antonio Formation, Yerba Buena Mud and Upper Alameda Formation, a shorter pile length could be accommodated on the southern alignment when compared to the same assumption applied to the northern alignment. The shorter pile length would result in cost savings as follows:

Pier	Number of Foundations	Piles each Foundation	Total no. of piles	Savings in length, per pile	Total Length of Shortening	Unit Cost per meter	Savings
E3 to E6	8	9	72	17	1224	$1,980	$2,423,520
E7 to E10	8	9	72	9	648	$1,980	$1,283,040
E11 to E13	6	9	54	9	486	$1,980	$962,280
E14 to E16	6	9	54	6	324	$1,980	$641,520
Total Savings							**$5,310,360**

Summary of Savings Due to Pile Group Change

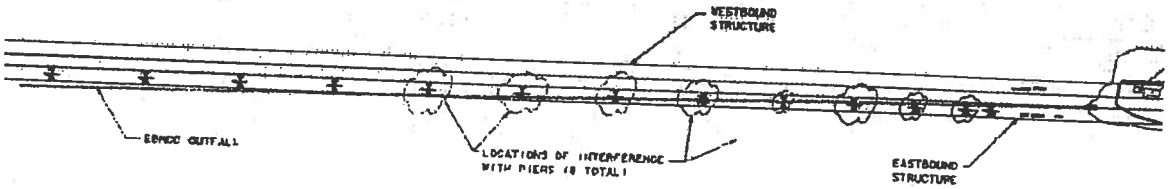
3.4 UTILITY CONFLICTS

Eight foundations of the southern alignment eastbound structure conflict with the EBMUD Sewer Outfall as shown below. Several options are available to overcome this conflict that include:

- Modify the bridge foundations to straddle the pipe.
- Relocate a portion of the EBMUD sewer outfall.
- Modify the bridge alignment as to clear the pipe.

3.4.1 Modify the Bridge Foundations

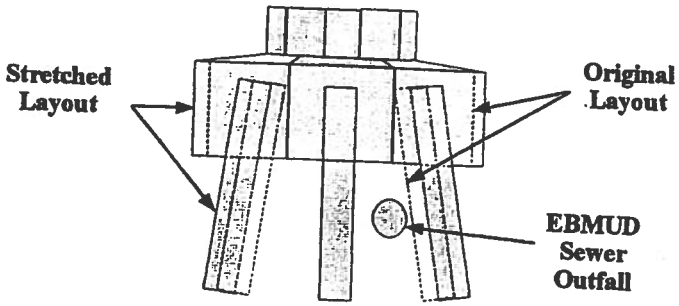
The Modified S-1 alignment studied in this report has eight pier locations that conflict with the EBMUD outfall. Of these eight, six will require minor modifications, while the other two will need a more substantial rework to avoid the outfall as explained below.



Eastbound Structure / Outfall Interference at Eight Locations

Six piers are located over and above the pipe, and will need minor modifications. At these locations the outfall pipe is located approximately 8-meters below the bottom of the pile cap. To avoid conflicts, the current pile cap/pile group configuration can be expanded and rotated as needed to avoid the pipe. It is assumed that a total quantity increase of 350 m^3 of concrete at each affected pile cap is needed.

The modified pier foundation is shown in the figure spanning over the outfall pipe. As can be seen from the figure, the size of the outfall pipe is not large enough to cause a great deal of interference with the even larger bridge foundations.



Foundation Modification

The other two piers (eastern most skyway piers) will require significantly more modification, as the outfall pipe is located at the same elevation as the pile cap. In this case, the pile cap is moved above the pipe, with the pipe straddled similar to the other six. For all eight locations, a minimum distance from face of outfall pipe to face of pile is assumed to be 1.5 meters.

The outfall pipe will be protected in place during construction, using Caltrans Standard Specifications and project specific special provisions. Any protection measures for the pipe during construction will be coordinated with EBMUD. Long-term seismic protection should not be an issue due to the very small displacements anticipated from the battered pile foundations during earthquakes.

The presence of underground obstructions under and adjacent to bridge foundations is occasionally encountered and accommodated during the design process. The Caltrans publication "Manual on High & Low Risk Underground Facilities Within Highway Rights of Way" recommends 24 inches of clearance between piles and a utility. Section V of that publication is titled "Alternatives to Relocation", and gives instructions for accommodating facilities in place. This section is reprinted in the Appendix along with some examples of similar situations of bridge foundations in close proximity to underground obstructions. Also included are examples of Standard Special Provisions that Caltrans uses for such cases.

The change in quantities is as follows:

CONTRACT ITEMS	Unit Price	Quantity	Amount (Increase)
Structural Concrete Bridge Footing - m^3	$490	2800 m^3	($1,372,000)
Bar Reinforcing Steel (Epoxy Coated) – kg	$2.00	744,800kg	($1,489,600)
Total (Increase)			**($2,862,000)**

Summary of Cost to Accommodate the EBMUB Outfall

4 Summary of Cost Impacts

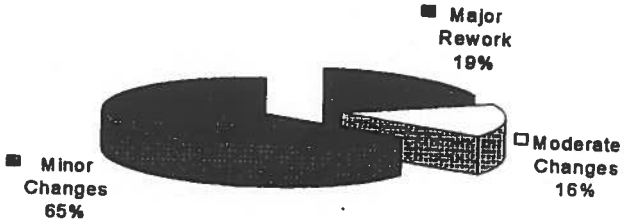
The Modified S-1 alignment is a superior alignment to the current northern alignment with respect to structural design issues. Significant cost savings can be realized by relocating the bridge shown in the 45% submittal to the southern alignment. A summary of the cost savings is as follows:

Cost Savings of Modified S-1 Alignment	
Item with Cost Impact	Savings or (Cost)
Length of Structure	$29,607,000
Tower and Anchor Pier Locations	
Pier W2	$198,000
Pier E2	-
Main Pier	($18,830,000)
Bay Mud Characteristics	
Change pile group	$32,637,000
Reduce length	$5,310,000
Utility Conflicts	
EBMUD Sewer Outfall	($2,862,000)
Sub-Total	**$45,862,000**
Contingencies (25%)	$11,466,000
TOTAL SAVINGS	**$57,328,000**

5 Schedule Impacts

Impacts to the current replacement schedule from relocating the bridge are minimal if the decision to relocate is made soon. The bridge should be realigned immediately to the Modified S-1 alignment to maximize the savings. Further delay of the move will only result in more at risk design dollars being spent, and will soon begin to jeopardize the delivery schedule.

The current schedule can be maintained even with the realignment. Although Caltrans indicates a 50% completion, the level of detail shown on the plans can be considered a skeletal layout at best. There are no in-depth details, so only adjustments of the plans for changes in alignment and profile are needed. Over 80% of the current plans can be salvaged with moderate to minor changes, and all of the analytical work is easily adapted to a new alignment. All re-work of the plans can be done within the time frame currently established for the design of the bridge. See the Appendix for a summary of the sheets needing changes due to the change of alignment.



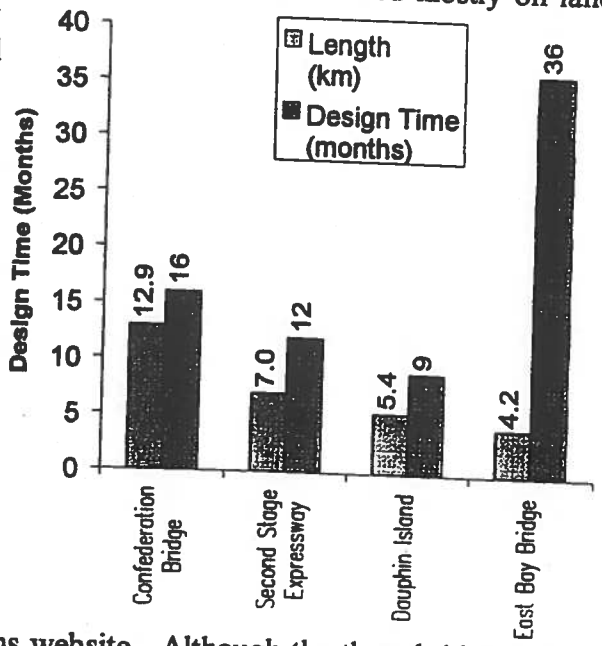
45% Plan Changes Required for Modified S-1 Alignment

To put the schedule issue into perspective, a comparison to other large bridge projects and design delivery schedules is helpful. Samples of other large bridge projects are compared for the length of the bridge and the design schedule. As the following chart illustrates, the design time for three other bridges of similar magnitude to the East Bay Bridge are compared.

The *Confederation Bridge* is a 12.9km bridge crossing the Northumberland Strait between New Brunswick and Prince Edward Island in Eastern Canada. The bridge was built using the design-build method of procurement, so the design and construction phases actually overlapped some, as is common in the design-build environment. The delivery of final design included the production of several thousand shop drawings, but even so, the design work was essentially completed in a period of 16 months. The design was based on a concept of totally precast bridge elements, designed for extremely adverse conditions across a body of water covered with ice for much of the winter. Much of the design was of an original nature, with no other similar type bridges to study, much like the design Main Span of the East Bay Bridge.

The *Second Stage Expressway* was also a design-build bridge project built in Bangkok, Thailand. The 7km segment considered here was designed, built and turned over to the owner in only 18 months. The bridge type is a concrete box girder built using precast segments. The Skyway Structure is proposed as precast concrete segments as well. Again, there was some overlap of the design and construction phases in design-build, but the design was completed in 12 months. This project was constructed mostly on land, although the congestion of the roadway system made for very difficult design and construction constraints.

The original *Dauphin Island Bridge* was destroyed by a hurricane in September of 1979. Design of the replacement bridge began in October 1979, and construction was completed in 32 months. The total bridge is 5.4km long, with the 1.2km main span constructed in the precast balanced cantilever method, similar to the proposed East Bay Bridge Skyway Structure.



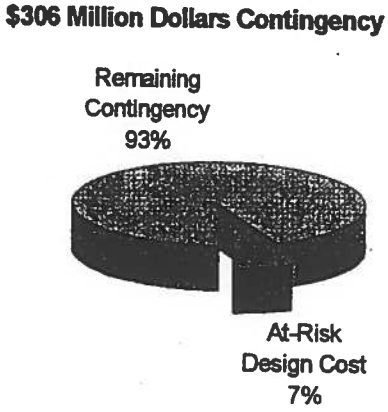
The chart above shows these three examples contrasted with the East Bay Bridge schedule obtained from the Caltrans website. Although the three bridges shown are design-build projects, the chart gives a good graphical representation of design schedules that bridge engineers are accustomed to for projects outside California.

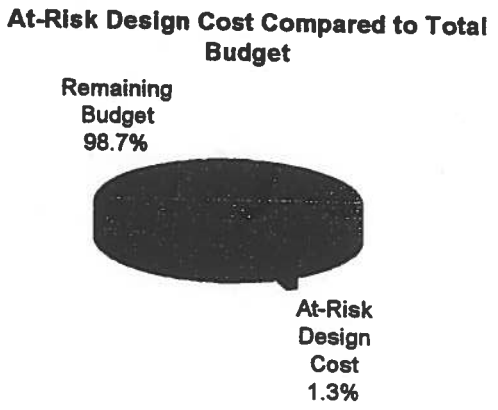
6 Conclusion

The procedures for selecting the preferred alignment for a bridge are established through the Environmental Impact Statement process. According to the Draft EIS, the northern alignments have impacts on the historic properties on Yerba Buena Island. Avoidance of impacts is always preferred to mitigation, therefore the City of San Francisco is following a prudent course of action to study the southern alignment. As this study shows, the southern alignment is not only possible, but also a superior choice of alignments.

Much of the prior design effort undertaken by Caltrans can be salvaged if the alignment is changed, and savings may still be realized even though significant funds have been expended on "at-risk" design. This is called at-risk because any design past what is needed to support the environmental documentation, (usually called a 30% design), is done so on an assumption that the project will be approved. If the project must change to satisfy environmental concerns, the design must be changed and the funds expended on design are lost. This is why the Federal Highway Administration does not authorize reimbursement of design costs past 30% completion until a Record of Decision granting approval of the environmental documentation has been filed.

Caltrans and the MTC are understandably reluctant to change at this point and lose the at-risk design expenditures. But this needs to be put into perspective with the magnitude of this project. Caltrans has been using the standard 25% contingency for this project, with additional contingencies added on for "Ground Motions". This totals up to an impressive $306 million in contingencies. The chart below puts into proportion how much the "at-risk" dollars represents of the total contingency fund. Remember that this bridge is 50% complete, and only 7% of the contingency fund has been used.





The Modified S-1 alignment is superior to the N-6 alignment, it is less costly and there will be no delay to the delivery schedule if this bridge is moved now.

King / Daines / Heminger / [illegible]

Agenda Item No. 2

[illegible]

CITY HALL • 1 FRANK H. OGAWA PLAZA • OAKLAND, CALIFORNIA 94612

IGNACIO De La FUENTE
President of the City Council

510 / 238-7005
FAX / 238-6910
TDD / 238-7413

June 10, 1999

Supervisor Mary King
Metropolitan Transportation Commission
Joseph P. Bort Metro Center
101 Eighth Street
Oakland, CA 94607-1700

Dear Supervisor King:

The City Council continues to advocate for a replacement bridge that ensures the safety of our citizens, is aesthetically world class, and meets our long-term transportation needs. Specifically, we endorse:

1. A northern alignment designed to maximize the open space area adjacent to the Oakland anchorage.
2. Appropriate provisions for local hiring and contracting goals.
3. A gateway and park at the anchorage in Oakland.
4. A world-class, aesthetic design (assuming that the design process is re-opened and it does not cause undue delay).
5. A study of long-term passenger rail options between Oakland and San Francisco and provisions for rail built into the new eastern span bridge structure.
6. A bicycle/pedestrian path from Oakland to San Francisco.

If you need further clarification, please contact me at (510) 238-7005.

Sincerely,

IGNACIO DE LA FUENTE
Council President

cc: Bay Bridge Design Task Force
Steve Heminger, MTC
Denis Mulligan, Caltrans
Brian Marony, Caltrans
Claudette Ford, PWA

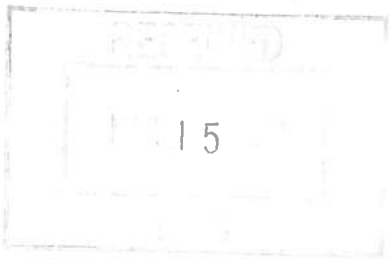
Agenda Item No. 2

YERBA BUENA ISLAND DEVELOPMENT

STATE OF CALIFORNIA GRAY DAVIS, *Governor*

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
THIRTY VAN NESS AVENUE, SUITE 2011
SAN FRANCISCO, CALIFORNIA 94102-6080
PHONE: (415) 557-3686

S.H



March 11, 1999

Annemarie Conroy
Executive Director
Treasure Island Project
410 Avenue of the Palms
Building 1, 2nd Floor
San Francisco, CA 94130

Dear Ms. Conroy:

In your March 4, 1999 letter you requested a copy of any resolution passed by our Commission outlining the reasons why BCDC supports a northern alignment for a bridge structure to replace the eastern span of the San Francisco-Oakland Bay Bridge. You also requested "the precise language allowing Commissioners to vest in the Executive Director the power to advocate for the N-6 [northern alignment], a plan which ignores BCDC's own mandates and policies."

Regarding your first request, the Commission does not typically adopt resolutions. Instead, BCDC often adopts staff recommendations, sometimes with revisions the Commission deems necessary. Such was the case when our staff made a recommendation on the replacement structure on June 18, 1998. I have enclosed the June 12, 1998 staff report which our Commission considered, the relevant section of the minutes for the June 18, 1998 BCDC meeting, and the June 19, 1998 letter transmitting BCDC's conclusions to the Bay Bridge Design Task Force.

Regarding your second request, the Commission has not authorized me to advocate for a northern alignment, and I have not done so. On June 18, 1998, the Commission endorsed the EDAP recommendations, which included a northern alignment, because the recommendations "adequately address, at this level of design, the issues BCDC will have to consider when Caltrans submits a permit application for the replacement bridge." I explained this at the February 24th Bay Bridge Task Force meeting when I stated that the northern alignment was not perfect and that other alignments could probably address the issues of concern to the Commission equally or perhaps even better than the one chosen. However, since the primary purpose of the bridge replacement project is to address a serious earthquake hazard problem as quickly a possible, I cautioned against exploring other alternatives if that would delay the completion of this critical public safety project.

I hope this information is helpful to you in understanding BCDC's position on the alignment of the replacement bridge.

As to San Francisco's plans for Yerba Buena Island, when we wrote the August 16, 1996 letter you referenced, our impression was that the residential development planned for Yerba Buena Island would be limited to redeveloping existing residential units and to limited low density new housing that would be part of visitor-serving and recreational facilities. Your March 4th letter also leaves me with that impression. I suspect that our Commission could find this type of limited residential development acceptable. Yet at the February 24th Task Force meeting, I understood you to say that the principal reason San Francisco opposes a northern alignment for a bridge structure is that it would preclude a large residential project from being developed on Yerba Buena Island. This seeming change in your reuse plan surprised me. I regret that you found it inappropriate and unprofessional for me to ask about this issue as soon as I became aware of it.

I also understand that after San Francisco prepared the reuse plan which we reviewed in 1996, the Urban Land Institute formulated recommendations for Yerba Buena Island and that ULI recommended against any large scale residential development on the island. To help us sort out these seeming contradictions, I would appreciate it if you would clarify the scale and type of residential development San Francisco is currently contemplating on Yerba Buena Island.

Sincerely,

WILL TRAVIS
Executive Director

cc: Commissioners and Alternates
Rear Admiral Ronne Froman, U.S. Navy
Denis Mulligan, Caltrans
Larry Dahms, MTC

Dahms, Heminger,

OFFICE OF THE MAYOR
SAN FRANCISCO

TREASURE ISLAND PROJECT
410 AVENUE OF THE PALMS
BUILDING 1, 2ND FLOOR
TREASURE ISLAND
SAN FRANCISCO, CA 94130
(415) 274-0660
FAX (415) 274-0299

WILLIE LEWIS BROWN, JR.

March 4, 1999

BY FAX DELIVERY

Mr. Will Travis
Executive Director
BCDC
30 Van Ness Avenue
Suite 2011
San Francisco, CA 94102

Dear Mr. Travis:

Thank you for your letter following up on a "brief discussion" on Wednesday, February 24th. I would hardly characterize the exchange as a discussion and would have expected you to raise certain issues in an appropriate and professional manner by contacting our offices prior to the 24th to discuss your alleged "concerns".

Your letter is most enlightening with regard to your advocacy for the N-6 alignment.

It is important to clarify some issues with regard to the applicability of the Bay Plan to future development on former Naval Station Treasure Island. Contrary to your quote in the Chronicle the other day, the City has carefully considered the effects of the Bay Plan on Yerba Buena and Treasure Islands. As you know, the City's Reuse Plan requires a 100-foot shoreline band around both islands. In addition, we are confident that uses of Yerba Buena

Island proposed in the Reuse Plan, including, for example, a bed and breakfast, conference center, cafes and other public, recreationally oriented uses, are consistent with the Bay Plan.

Our confidence in this conclusion was underscored by your letter of August 16, 1996, noting that (1) "...our staff believes the plan, and especially proposed shoreline public access and recreational opportunities, are fully consistent with the Commission's laws and policies," and (2) "We believe the Draft Reuse Plan is consistent with these policies because it denotes a perimeter public promenade around Treasure Island, including a small park...and considerable open space on Yerba Buena Island at the connection to the Treasure Island causeway...The City and County of San Francisco should be commended for its efforts in producing a Draft Reuse Plan that so closely conforms to the Commission's regional goals and policies." See Attachment A.

Please be assured that if we plan to include uses that are not consistent with the Bay Plan, we will seek appropriate amendments. We are confident that the resulting combined Treasure Island/Yerba Buena Island development will enhance recreational uses beyond those available today.

The City of San Francisco has proposed the modified S-1 alignment. This plan should be of significant interest to BCDC, given its mandate to protect the Bay, its shoreline areas and to administer the Bay Plan and to minimize fill of the Bay. The S-1 alignment has many environmental benefits that should be taken into consideration by BCDC prior to advocating the N-6 alignment which creates a number of issues under the Bay Plan which have been conveniently ignored.

We trust that BCDC is exercising its guardianship of the Bay Plan with regard to Caltrans' Bay Bridge project as diligently as it has with Treasure Island. In considering the consistency of the various alignments with the Bay Plan, BCDC should be aware of the following:

1. The S-1 alignment provides significantly more recreational use opportunities on Yerba Buena Island than the proposed northern alignment. The N-6 alignment directly takes over six acres of Yerba Buena Island and indirectly impacts another 30 acres. By contrast, the S-1 alignment takes only 3.6 acres of property, of which 1.6 acres are in a federal enclave and thus not available for recreational use by Californians. Thus, the Bay Plan policy favoring recreational use of YBI that was the subject of your letter is better served by the S-1 alignment.

2. The northern alignment fills more of the Bay than the S-1 alignment. The S-1 alignment is shorter and more direct than the northern alignment and, thus, would create less Bay fill.

3. The S-1 alignment, in its East Bay touchdown, provides greater protection to sensitive habitat areas in tidal marsh and wetlands areas identified in the Bay Plan – the Emeryville Crescent Wildlife Area. The N-6 causes devastation to the conservation area on this northern "spit" of property placing pilings and footings throughout this sensitive area highlighted in the Bay Plan. The S-1 provides less damage and impact to this East Bay shoreline and provides for an opportunity to protect up to two times the shoreline than the N-6 provides.

4. The Bay Plan shows another East Bay area impacted by the S-1 – the Port of Oakland. This shoreline area, according to the Bay Plan, is slated for Port and other industrial uses. It appears your advocacy for the N-6 to protect a "park" on the spit is inconsistent with the Bay Plan. The S-1 alignment preserves the entire Port expansion area, unlike the S-4 alignment (considered by Caltrans in the DEIS and rejected in favor of the N-6) which would take 15 or more acres.

Since it appears that the S-1 alignment supported by the City of San Francisco is more consistent with the Bay Plan's priority policies than Caltrans' proposed northern alignment (including the policy favoring recreational use of Yerba Buena Island referenced in your letter), we find your unsolicited legal advice and your vocal advocacy for the northern alignment puzzling.

I would appreciate a copy of any resolution passed by your Commission outlining the reasons BCDC supports the N-6 alignment and the precise language allowing Commissioners to vest in the Executive Director the power to advocate for the N-6, a plan which ignores BCDC's own mandates and policies.

At a minimum, BCDC should compare the N-6 and the S-1 for consistency with the Bay Plan before invoking BCDC policy to criticize the S-1 alignment. In order that we may better understand BCDC's position on these matters, please provide me with whatever comparative analysis BCDC has done regarding the relative consistency of the N-6 and S-1 alignments to the Bay Plan.

I look forward to a fair and impartial response.

Sincerely,

Annemarie Conroy
Executive Director

CC: Governor Gray Davis
Mayor Willie L. Brown, Jr.
Mayor Jerry Brown
All MTC Commissioners
All EDAP Members
San Francisco Board of Supervisors
Secretary Slater
All BCDC Commissioners and Alternates
Secretary William Cassidy, USN
Admiral Froman, USN
Hon. Mary King
Jose Medina, CALTRANS
Larry Dahms, MTC ✓

ATE OF CALIFORNIA Dahms, Heminger, Brittle, McCallum, Clausen GRAY DAVIS, Governor

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
THIRTY VAN NESS AVENUE, SUITE 2011
SAN FRANCISCO, CALIFORNIA 94102-6080
PHONE: (415) 557-3686

March 1, 1999

Annmarie Conroy, Executive Director
Mayor's Office Treasure Island Reuse Project
410 Avenue of the Palms
Building 1, Second Floor
Treasure Island
San Francisco, CA 94130

SUBJECT: Yerba Buena Island Reuse Plan

Dear Ms. Conroy:

I am following up on the brief discussion we had during the meeting of the Bay Bridge Design Task Force last Wednesday.

As you emphasized during your presentation to the Task Force, the principal reason for San Francisco's opposition to a northern alignment for a bridge structure to replace the eastern span of the San Francisco-Oakland Bay Bridge is that a bridge on the northern alignment would preclude a large residential project from being developed on Yerba Buena Island. As I mentioned, BCDC's *San Francisco Bay Plan* designates the entire Yerba Buena Island as a park priority use area. The Plan includes the following enforceable policy statement: "If and when not needed by Navy or Coast Guard, redevelop released areas for recreational use." This designation and policy have been in place for over 30 years and have been approved by the federal government pursuant to the provisions of the federal Coastal Zone Management Act (CZMA).

Under California law, BCDC's permit authority (i.e., the "coastal zone") extends inland only 100 feet from the Bay shoreline. However, under the CZMA, any federal agency activity—within or outside the coastal zone—that affects the coastal zone must be consistent to the maximum extent practicable with California's enforceable coastal policies. BCDC has determined that any federal activity that is inconsistent with one of the Bay Plan priority use designations affects the coastal zone and must comply with CZMA requirements. The transfer of federal property to a local government is a "federal activity" as that term is used in the CZMA; therefore, it will be necessary for the U.S. Navy to submit a "federal consistency determination" to BCDC before it can transfer Yerba Buena Island to the City and County of San Francisco.

In reviewing this determination, our Commission will consider how San Francisco plans to use the property. We would expect that the Commission would find limited commercial use of the historic buildings on Yerba Buena Island to be generally consistent with recreational use of the Island. This is similar to the approach that is being used at the Presidio of San Francisco. However, any large scale new residential development would probably be seen as incompatible with general recreational use of the Island.

San Francisco can request that BCDC delete the park priority use designation on Yerba Buena Island. Applicants for Bay Plan amendments must pay the cost of our processing of the amendment request. In determining whether or not to delete this designation, the Commission would

consider whether there is some compelling reason, from a regional perspective, to drop the designation. I expect that proponents of a northern alignment for the replacement bridge might oppose lifting the Bay Plan park designation on Yerba Buena Island.

I would be pleased to discuss this matter further with you and representatives of the U.S. Navy if you would find this helpful.

Sincerely,

WILL TRAVIS
Executive Director

cc: Commissioners and Alternates
Rear Admiral Ronne Froman, U.S. Navy
Honorable Mary King, Chair, Bay Bridge Design Task Force
José Medina, Director, Caltrans
Larry Dahms, Executive Director, MTC

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
30 Van Ness Avenue, San Francisco 94102 557 - 3686

PRIORITY USE AREA DESIGNATIONS AND BOUNDARY DESCRIPTIONS

Adopted November 18, 1971
As Amended through January 15, 1987

1. The following priority use areas are each designated for the particular water-oriented land use printed in parentheses following the name of the area. The name of the area is for purposes of identification, and is not part of the designations. The designations are pursuant to Commission resolutions passed in accord with Government Code Section 66611.

2. Boundary descriptions are as follows: One boundary is the shoreline of San Francisco Bay, one boundary is a line 100 feet inland from and parallel to the Bay, and the other two boundaries listed below are the boundaries perpendicular to the shoreline and the line 100 feet inland.

3. Boundary lines, rights-of-way, and assessors' maps of parcels are those current on July 1, 1971, except for amendments which are current as of the date of the amendment. The physical features referred to are as shown on the U.S.G.S. 7-1/2 minute quad maps, 1968 photorevisions. References to roads and to the "line" of a road refer to the right-of-way line of the named road rather than to the edge of the pavement of the road. Some of the descriptions are followed by the name of the major property owner within the described priority use area; this information is furnished as a convenience to users but is not part of the designation.

4. The provisions of the Commission's Administrative Regulation 10180, (to be renumbered 10133 in 1984), which provides a method for resolving boundary questions, shall apply to these priority use boundary designations to the extent possible under the McAteer-Petris Act.

1. Marin Headlands (Recreation)

   (A) West Boundary: Point Bonita.

   (B) East Boundary: Marin Headlands, State Park boundary.

2. Angel Island (Recreation)

   (A) Entire Island (State).

3. Audubon Wildlife Sanctuary (Wildlife)

   (A) West Boundary: West line of parcel 55-011-34 (Aududon Society).

   (B) East Boundary: East line of parcel 55-011-34.

(B) West Boundary: Southwesterly line of parcel 1313-15 (State of California).

85. Alcatraz Island (Recreation)

(A) Entire island.

86. Yerba Buena Island (Recreation)

(A) Entire island from a line across land neck joining Yerba Buena with Treasure Island, 400 feet southeast of the southeastern edge of Treasure Island.

(Map 10)

Cavallo Pt.

Lime Pt

Pt. Diablo

Golden Gate Bridge

Golden Gate

Fort Pt

South Bay

Pt. Lobos

Pacific Ocean

ALCATRAZ ISLAND

Use under study. Retain in public ownership. Access by boat only. Special design opportunity.

Alcatraz Island

TREASURE ISLAND

If and when not needed by Navy, redevelop for public use. Provide continuous public access to Bay.

Treasure Island

SAN FRANCISCO BAY

GOLDEN GATE BRIDGE

Encourage improved public transportation. No second deck or new crossing for automobiles.

FISHERMAN'S WHARF

Improve and expand commercial fishing support facilities. Enhance public access to and economic value of Fisherman's Wharf area by encouraging development of a public fish market.

YERBA BUENA ISLAND

If and when not needed by Navy or Coast Guard, redevelop released areas for recreational use.

Yerba Buena Island

(Map 5)

FORT MASON

As not needed by Army, develop waterfront and northeast section as park.

CR

North Pt

Possible scenic transit system along waterfront from Ocean Beach to China Basin.

BART

San Francisco-Oakland Bay Bridge

SAN FRANCISCO WATERFRONT SPECIAL AREA PLAN

See special area plan for detailed planning guidelines for the shoreline between the east side of the Hyde Street Pier and the south side of India Basin.

PRESIDIO

If and when not needed by Army, retain at least shoreline and undeveloped areas as regional park.

SAN FRANCISCO

China Basin

PORT OF SAN FRANCISCO

See Seaport Plan. Redevelop southern waterfront for modern marine terminals. Some fill may be needed.

Central Basin

CR

Potrero Pt.

SAN FRANCISCO BAY

Islais Creek Channel

SOUTH BASIN

Some fill may be needed in inlet west of proposed freeway.

India Basin

Hunters Pt.

HUNTERS POINT NAVAL SHIPYARD

Some fill may be needed for shipyard. If and when not needed by Navy, should be developed for port and related industrial use. See Seaport Plan.

South Basin

CR

BAY VIEW PARK

Provide trail link to waterfront.

Candlestick Pt.

CANDLESTICK POINT SHORELINE PARK (proposed)

Some fill may be needed.

Brisbane

U.S. 101 CAUSEWAY

Develop scenic frontage road and turnouts for viewing and fishing. Protect shellfish beds offshore.

Southern Pacific

Visitacion Pt.

No freeway in Bay east of U.S. 101 unless all reasonable alternatives are found infeasible and need for Bay route is clearly shown.

BRISBANE AQUATIC PARK (proposed)

Provide easy pedestrian access across freeway.

SAN BRUNO MOUNTAIN Regional Park (proposed)

Sierra Pt.

Oyster Pt.

South San Francisco

CR

(Map 9)

(Map 9)

LEGEND

PORT

WATERFRONT PARK, BEACH

	EXISTING	PROPOSED
MARINA	⚓	
FISHING PIER		
RECREATIONAL FERRY		
LAUNCHING RAMP		
COMMERCIAL RECREATION		CR
ENTRANCE VIEW FROM ROAD		
VISTA POINT	*	
SCENIC DRIVE	101	
FREEWAY	101	
RAILROAD		
BARTD		

COMMISSION POLICY: **PRINTED IN BOLD TYPE**
COMMISSION SUGGESTION: *PRINTED IN ITALICS*

1 .5 0 MILE 1

1 .5 0 KILOMETER 1

NORTH

San Francisco Bay Conservation and Development Commission

Amended June 1986

Plan Map 10

San Francisco and Brisbane

Agenda Item No. 2

U. S. NAVY

NOTIFICATION

METROPOLITAN
TRANSPORTATION
COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
Tel: 510.464.7700
TDD/TTY: 510.464.7769
Fax: 510.464.7848

Memorandum

TO: Bay Bridge Design Task Force

DATE: May 5, 1999

FR: Steve Heminger

RE: Caltrans/U.S. Navy correspondence

At the special joint meeting of the Task Force and your Engineering and Design Advisory Panel (EDAP) on February 24, officials from the U.S. Navy repeated their claim that they had not been adequately notified of plans for a replacement Bay Bridge eastern span on a northern alignment. At the meeting, Chairperson Mary King asked Caltrans to forward to MTC copies of any correspondence between Caltrans and the Navy that might shed light on the subject.

On May 3, MTC received the attached cover letter from Caltrans together with an inch-thick binder of correspondence between Caltrans and the U.S. Navy dating back to March 1996 -- 11 months before the Task Force and EDAP were even created. I attach three letters from Caltrans to the Navy from that chain of correspondence which clearly demonstrate that the Navy was provided early, repeated, written notification (complete with maps) of the possibility of a replacement eastern span on a northern alignment.

If you have any questions about the matter, please contact Denis Mulligan of Caltrans at (510) 286-6293 or me at (510) 464-7810.

cc: Joseph Nicoletti, EDAP Chair
John Kriken, EDAP Vice Chair
Denis Mulligan, Caltrans

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

May 3, 1999

Supervisor Mary King
Chairperson, Bay Bridge Design Task Force
Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700

Dear Supervisor King:

Attached for your information and use, as requested during the joint Bay Bridge Design Task Force/Engineering and Design Advisory Panel meeting held on February 24, 1999, is a compilation of correspondence between Caltrans and the Department of Navy concerning the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project.

If you have any questions or need additional information, please contact me at (510) 286-6293.

Sincerely,

HARRY Y. YAHATA
District Director

By Denis Mulligan

DENIS MULLIGAN
Program Manager
Toll Bridge Program

Attachment

CC: Steve Heminger – MTC
Captain Hunter – U.S. Navy

b.1

OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
LAND, CA 94623-0660
J) 286-4444
TDD (510) 286-4454

March 28, 1996

4-SF, Ala-80
4259-04340K

Mr. Kenn Y. Parsons
Base Conversion Manager
Naval Station, Treasure Island
Department of the Navy
Engineering Field Activity, West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, CA 94066-5006

Dear Mr. Parsons:

Subject: R/W Requirements for San Francisco Oakland Bay Bridge (SFOBB) at Yerba Buena Island

This letter is in regard to Caltrans R/W needs for the proposed retrofit of the SFOBB. Specifically, it addresses the potential R/W needs for all options currently under study and the associated impacts at Yerba Buena Island (YBI).

While Caltrans continues to pursue our strategy for retrofitting the existing bridge, we feel it necessary to continue engineering studies of a new bridge alignment before arriving at a final decision.

Therefore, as requested at a February 22, 1996 meeting with your staff, Caltrans, the City of San Francisco, and the Coast Guard, we have attached a drawing outlining the Department's needs for all scenarios currently under study.

The area outlined in blue is the area required to retrofit the existing bridge. 50 meters from the bridge centerline on both sides will be sufficient to carry out the planned work. This area also represents the permanent R/W the Department would seek for a retrofitted SFOBB.

The area outlined in orange represents the Department's permanent R/W needs if the Department determines that a new east bridge should be built as its retrofit strategy.

The area outlined in green represents the temporary construction easement requirements associated with constructing a new bridge. Caltrans would need this area only during construction if a new bridge were pursued.

Also, it should be noted that Caltrans may not have a need for the R/W currently occupied by the existing bridge if the Department pursues a new bridge. The Department would likely remove the old bridge, thereby freeing up R/W that the existing bridge occupies.

Although the Department recognizes your need and desire to know the direction the Department will proceed in, we are not quite at that point yet. The best information available at this time is a maximum footprint of our needs for all studies currently under consideration. As studies progress, the Department will keep you informed of our direction. We expect a final decision on the retrofit strategy before the end of the year.

I hope this information is helpful as you continue with your studies at Yerba Buena Island.

If I can be of further assistance, do not hesitate to call me at (510) 286-5900.

Sincerely,

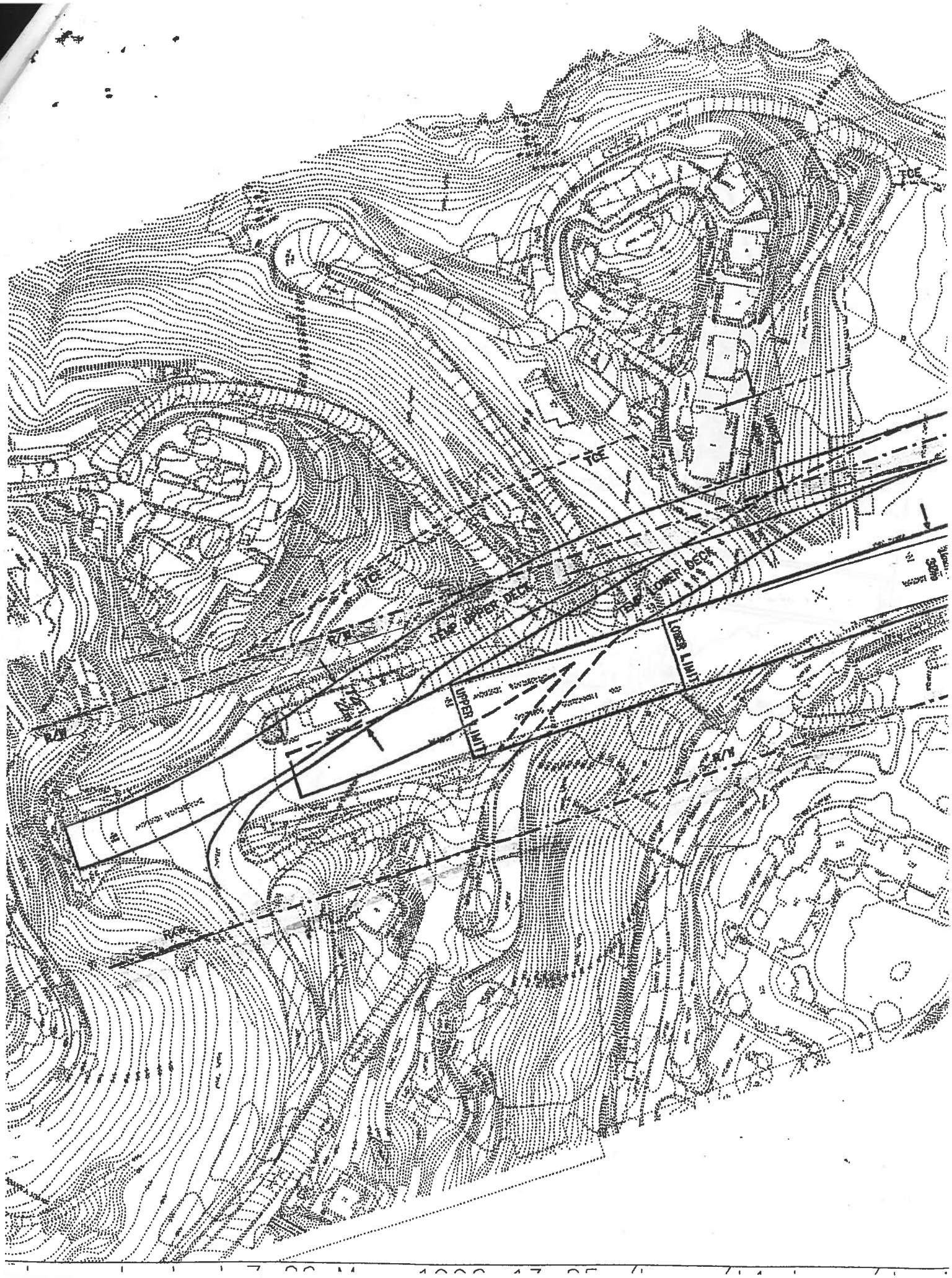
JOE BROWNE
District Director

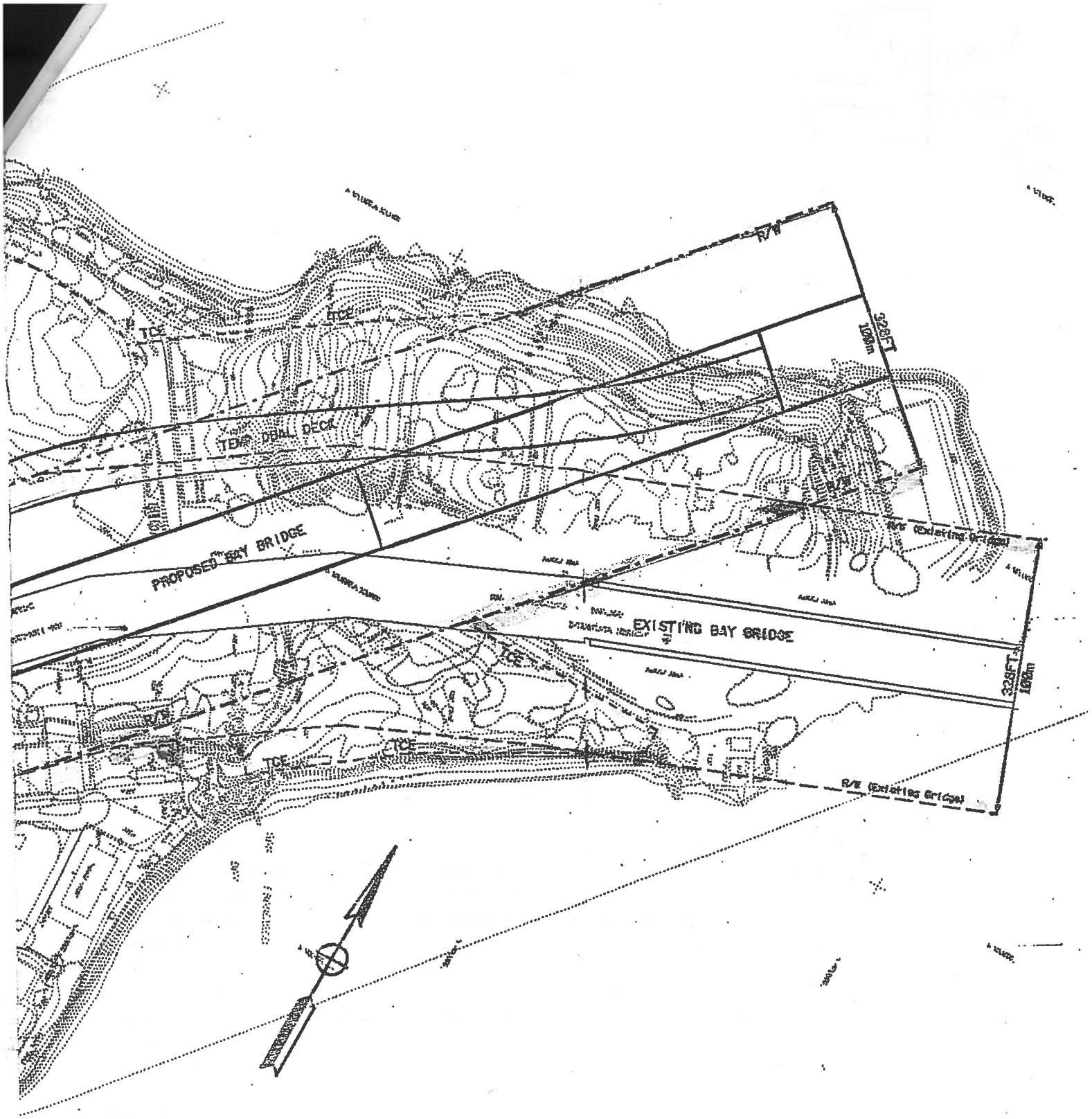
Attachment

cc: Rana Ahmadi
Planning Department
City and County of San Francisco
1660 Mission Street
San Francisco, Ca 94103-2414

T:jwl

cc: JWVan Loben Sels - HQ
JRoberts - Engineering Service Center HQ
TPost - Engineering Service Center HQ
HYYahata - Executive
DMulligan - Executive
DSteinhauser - Executive
RJMurphy - Executive
DOdell - Executive
GBehm - Executive
JSiebe - Executive
RMassberg - Structures Construction - South Bay
KTerpstra - Project and Program Management
PKPang/SLHulsebus/BZandipour


TCE
TCE
TCE
TCE
TEMP UPPER DECK
TEMP LOWER DECK
UPPER LIMIT
LOWER LIMIT
R/W
R/W
R/W
R/W



R/W needed to retrofit SFOBB

Permanent R/W needed for new SFOB

Temporary construction easement (TCE for new SFOBB

E OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION
OX 23660
AKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

PETE WILSON, Governor

COPY FOR
DEPT. Prog + Pkg Management
ATTN. K. Terpstra

July 10, 1996

4-SF,Ala-80
4259-01200k

Mr. Kenneth Y. Parsons
Base Conversion Manager
Naval Station Treasure Island
Department of the Navy
Engineering Field Activity, West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, CA 94066-2402

Dear Mr. Parsons:

Subject: Right of Way Requirements for San Francisco Oakland Bay Bridge (SFOBB) on Yerba Buena Island (YBI)

This is in response to your May 15, 1996 letter, regarding the Department's right of way requirements for the SFOBB on YBI.

To address your inquiry regarding whether or not the Department is pursuing a new bridge between YBI and Oakland, the Department is still conducting preliminary studies on this matter. A final decision on whether to consider proceeding with a new bridge project has not been made.

The Department is evaluating and refining all of its right of way needs for YBI (for the retrofit of the existing bridge and for the possibility of the new bridge). Issues being taken into consideration are points of access to the 100 meter right of way and reducing the 100 meter width where there is a conflict with an existing building. Also under further study is the nature of the tunnel area on YBI and the rights above the tunnel. The Department will submit another letter to you identifying specific and detailed right of way requirements for both scenarios.

The Department has been notified that Pacific Bell wishes to construct a wireless communication tower near the existing bridge on Macalla Road . The location of this tower will be in conflict with the Department's desire to acquire 100 meters of right of way around the existing bridge. The Department's policy is to exclude utility encroachments into its access controlled right of way. In the event that a new bridge is constructed, this tower will be a direct conflict to the new bridge construction. Since the proposed tower location is on Navy property, we request that the Navy deny Pacific Bell's forthcoming request to construct this tower. Attached for your information is a letter the Department recently sent to Pacific Bell's consultant regarding this issue.

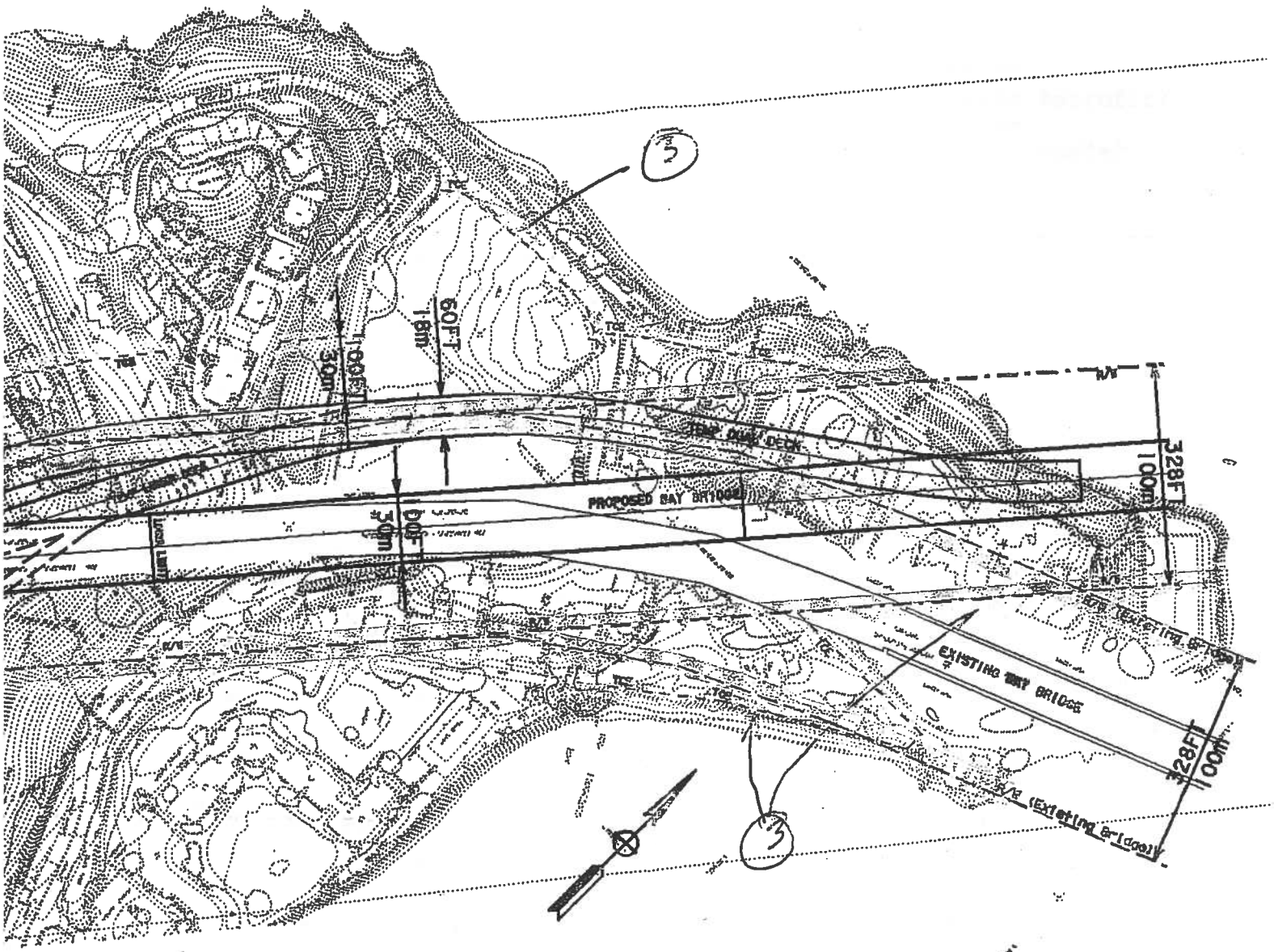
If you would care to discuss this matter further, please contact me at (510) 286-5900.

Sincerely,

JOE BROWNE
District Director

Attachment

Yerba Buena Isla



LEGEND

(1) Proposed R/W (permanently owned by Caltrans) for the Existing Bay Bridge

(2) Proposed R/W (permanently owned by Caltrans) for the new Bay Bridge

(3) Temporary Construction Easement (use of this land will be limited to time for construction))

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

January 28, 1997

4-SF-80
E.A.: 010300
SFOBB Seismic Retrofit/
New Structure
YBI/TI Land Transfer

Mr. Kenneth Y. Parsons
Base Conversion Commander
Naval Station, Treasure Island
Department of the Navy
Engineering Field Activity, West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, CA 94066-5066

Dear Mr. Parsons:

During the past 20 months the California Department of Transportation (Department) has worked closely with the Yerba Buena Island/Treasure Island (YBI/TI) base conversion staff and City and County of San Francisco (City) staff. This working group has attempted to develop a mutually agreeable transfer of the necessary fee title right of way for the San Francisco - Oakland Bay Bridge (SFOBB). There have been numerous meetings held in an attempt to address the fee area that the Department needs while addressing the issues of other current and possible future "users" of the islands.

In a March 28, 1996 letter to you (copy attached), the Department requested a 100 meter wide fee right of way (50 meters on either side of the center line of the existing structure). This letter also identified additional areas that would be needed on a temporary basis for the actual construction activities that would occur during the seismic retrofit of the structure.

The 100 meter fee requirement was based on input from the divisions that make up the Department and are responsible for keeping the SFOBB operating in a manner that is safe for the motoring public. Maintenance crews responsible for the day-to-day care of the bridge reviewed the activities normally conducted on, above and below the structure and determined that the 100 meter swath was the minimum needed to allow them to complete their required work in a safe and quality manner. The same approach was taken by the Department's Construction engineers, reaching a similar conclusion. The Department's Right of Way staff has had extensive experience with the last two major seismic events in the State (Loma Prieta in 1989 and Northridge in 1994) in dealing with similar areas, that is, the area that is located within this 100 meter swath of overhead structures. In many instances where development had been allowed to take place within close proximity to overhead structures there were costly (in terms of time lost and capital dollars spent to "clear the right of way") delays before repair and/or reconstruction activities could be undertaken.

The Department requires a number of Temporary Construction Easements (TCE's) in conjunction with the proposed retrofit of the existing SFOBB. The $1.3 billion seismic retrofit project is currently scheduled to be completed in the year 2004. The Department is entitled to the TCE's by virtue of the agreement executed between the Navy and the State dated December 20, 1962, Clause 8. This document states that the Navy agree's that "Should any reconstruction work be performed on the portion of the Bridge and approaches thereto crossing YBI, the State shall have the right to occupy areas adjacent to such construction work as may be necessary to accomplish such work", subject to Navy approval. The State is requesting a commitment for the areas needed based on the existing document. Mapping of the areas is enclosed.

In a July 10, 1996 letter to you (copy attached) the Department notified the Navy that a new structure was being considered and that we would be seeking a 100 meter fee right of way for any new structure constructed. This letter said that the Department would be submitting a request for right of way requirements for both scenarios (retrofitting of the new structure and building a new structure) for the SFOBB.

The construction of a new structure would require additional right of way (both fee and easements) on the eastern portion of YBI. Enclosed you will find maps which reflect this new alignment. You have indicated that time is of the essence. With this in mind, the Department requests that you convey the right of way necessary for both the seismic retrofit and the new structure. Any excess land will be handled in accordance to the Federal Land Transfer procedure.

In our meeting on January 15, 1997 you stated that you were planning to recommend the transfer of the entire island in fee to the City. The Department is strongly opposed to this course of action.

The issue of financial responsibility for retrofitting the western YBI ramps was also raised at the January 15, 1997 meeting. At that meeting you made the statement that since the State participated in the cost and construction of these ramps you felt the State was obligated to retrofit and maintain the ramps. The December 20, 1962 agreement states... "After the reconstruction work on said west side road connections is completed STATE shall have no obligations in the future to maintain or reconstruct any portion of such reconstructed roads, ramps, structures and improvements". This issue is clearly addressed in the cited agreement - the ramps are not the responsibility of the State.

4-SF-80
E.A.: 010300
SFOBB Seismic Retrofit/
New Structure
YBI/TI Land Transfer

On January 23, 1997 the State forwarded an informational letter to Mr. A. K. Mockus - Right of Way Program, Federal Highway Administration stating our intention to submit a complete land transfer package to his office by February 7, 1997 (copy attached). We are proceeding with the completion of the package and will submit a complete package (narrative request, metes and bound description and reference maps) based on the requirements stated in this letter to the Federal Highway Administration within the next two weeks. It is the Department's intent to complete the transfer prior to the Navy's vacating of the islands.

It is essential that these right of way issues be resolved immediately. Please contact me at (510) 286-5900 if you require assistance in expediting this process.

Sincerely,

Harry Y. Yahata
HARRY Y. YAHATA
Interim District Director

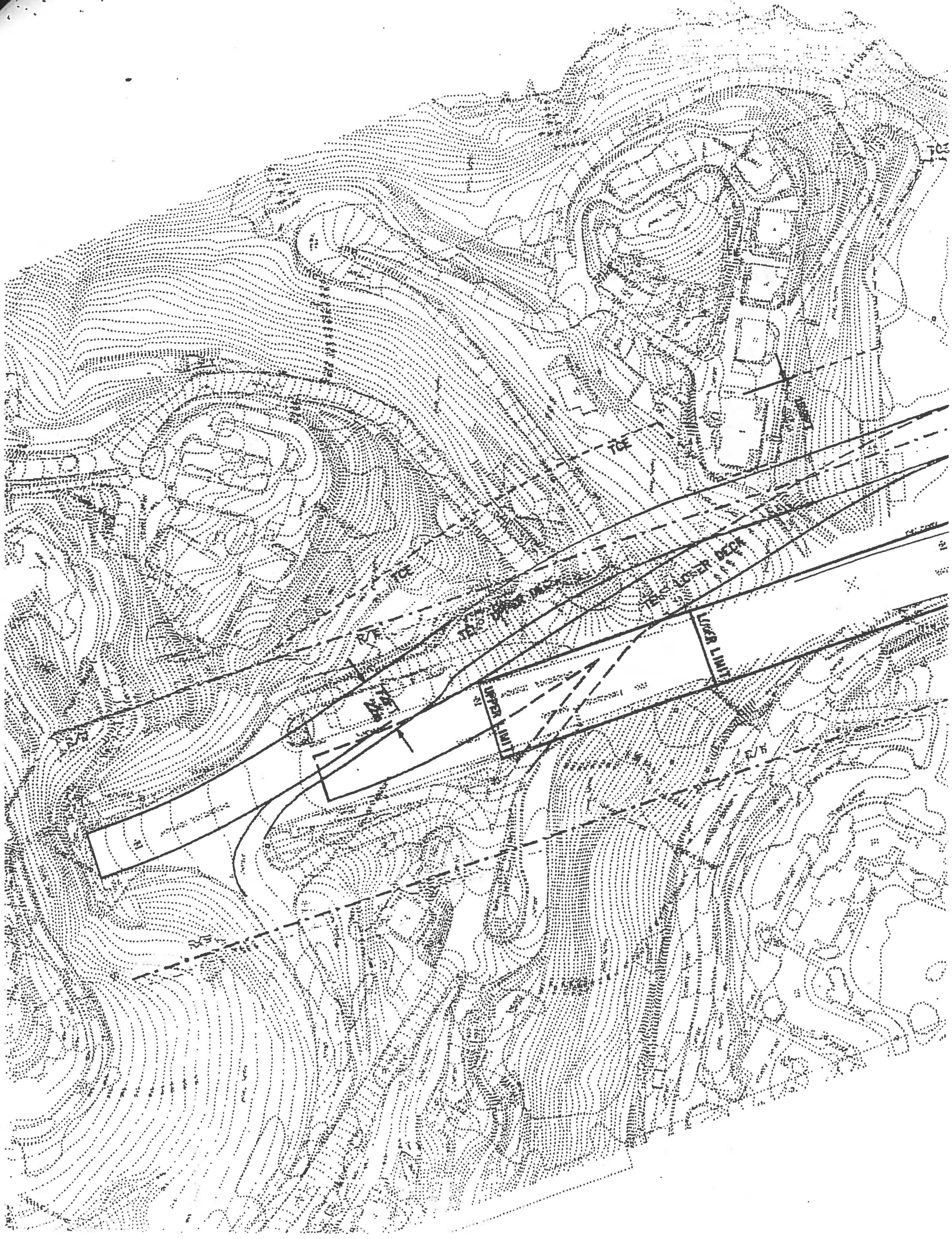
Attachment

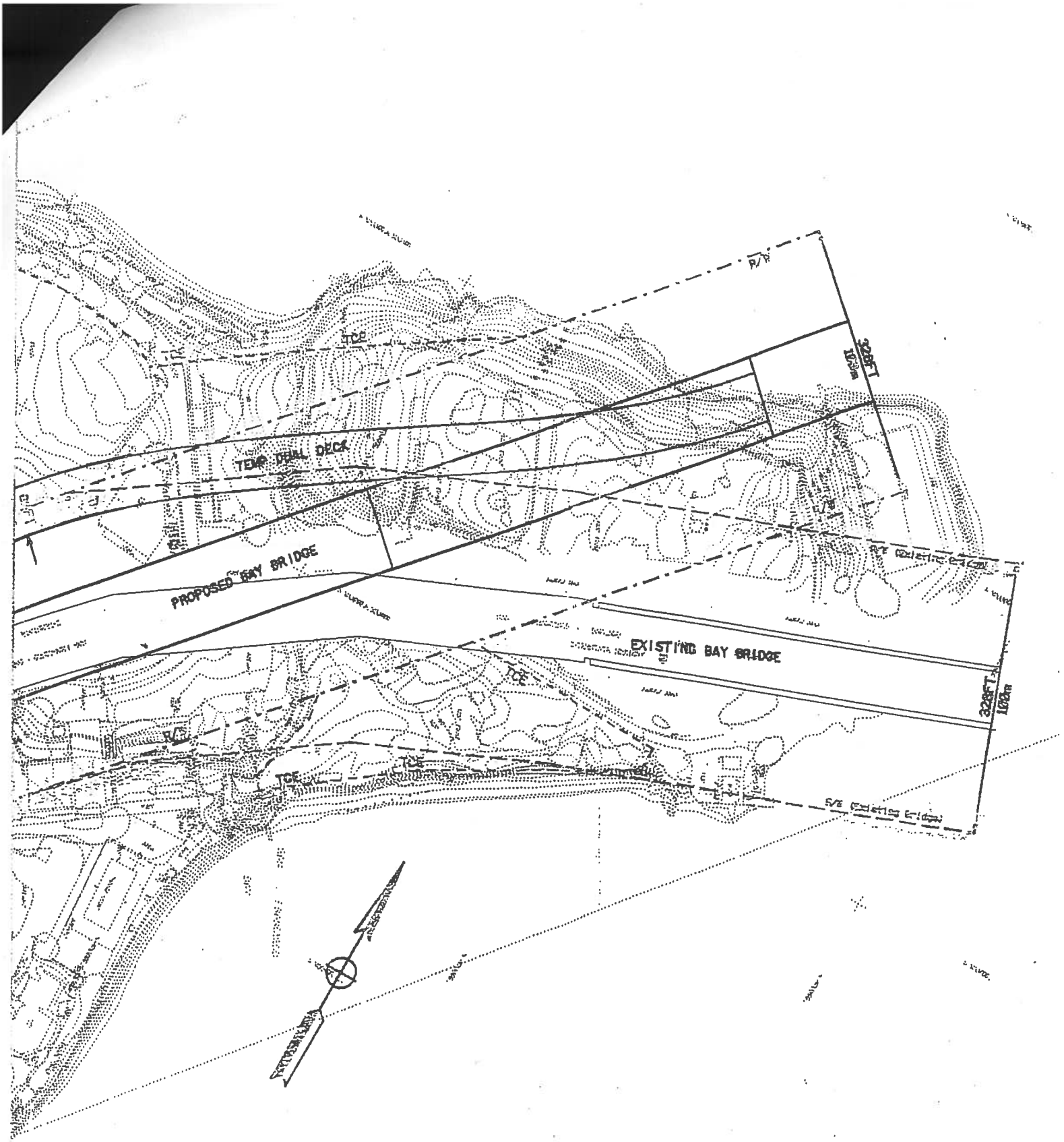
cc: City of San Francisco
Mayor Willie Brown
400 Van Ness Avenue
San Francisco, CA 94102

Department of the Navy
Commanding Officer
Engineering Field Activity - West
Attention: Code 2412
900 Commodore Drive
San Bruno, CA 94066-5006

Mr. Larry Florin
Project Director
The Mayor's Treasure Island-
Project Office
410 Palm Avenue
Building 1, Room 237
Treasure Island
San Francisco, CA 94130

Mr. A. K. Mockus
Right of Way Program
Federal Highway Administratio
980 9th Street, Suite 400
Sacramento, CA 95814-2727


TCE
TCE
R/W
UPPER LIMIT



R/W needed to retrofit SFOBB

Permanent R/W needed for new SFOE

Temporary construction easement (TC
for new SFOBB

Agenda Item No. 4.b.

METROPOLITAN TRANSPORTATION COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
Tel: 510.464.7700
TDD/TTY: 510.464.7769
Fax: 510.464.7848

Memorandum

TO: Bay Bridge Design Task Force DATE: July 8, 1999

FR: Executive Director

RE: EDAP Recommendations on Bay Bridge Design Amenities and Additional Information on Progress of Bridge Design

At the Engineering and Design Advisory Panel (EDAP) meeting on Wednesday, July 6, 1999, Caltrans staff and the T.Y. Lin design team presented design details and options under item 5 of the attached agenda. After extensive discussion, EDAP adopted the following recommendations by unanimous votes.

1. The new span should be equipped with strong motion instrumentation in order to measure its response to future earthquake forces.

   Incremental cost: Insignificant

2. The design should specify "geotechnical earth fill," as opposed to a structure on piles, beginning at the point where the bridge descends to the touchdown on the Oakland approach.

   Incremental cost: None

3. Two longer spans (104 meters each) should connect the suspension span with the Yerba Buena Island transition structure, as opposed to three shorter spans, in order to reduce the number of structures on Yerba Buena Island. Further study should determine the use of concrete or steel for the two longer spans.

   Incremental cost: $15 million

4. The bridge lighting plan, presented by T.Y. Lin lighting consultant Howard Branston, should be supported, but the light pole design is overly complex and should be simplified.

   Incremental cost: $18 million

5. Seven belvederes (rest stops) should be constructed on the bicycle/pedestrian path, one at each end of the suspension span and five spaced every 160 meters across the skyway. The handrails on the path should be of uniform height, and the light pole design should be simplified.

   Incremental cost: $1 million

6. All visible surfaces of the eastern span superstructure from Oakland to the tunnel entrance on Yerba Buena Island, excluding the roadway, should be white in color. The piers supporting the skyway and transition structure should be natural concrete color. Caltrans should make a study to determine whether to use white cement mixed in the concrete or a white epoxy paint finish.

   Incremental cost: $15 million

Additional information presented by Caltrans at the EDAP meeting:

1. Environmental Impact Statement (EIS):

   Caltrans is preparing two additional reports in response to comments on the EIS: 1) on impacts and reuse of dredged material; 2) on additional environmental protection required at the Oakland touchdown. Caltrans plans to release the final EIS in November.

2. Impact of Navy's refusal to allow soil testing on Yerba Buena Island:

   As of July 1, 1999, the project delay was nine months. All design work on the Yerba Buena Island structure has been halted until geological soil testing can be performed. Since one to two months is needed to prepare for soil testing, the current delay is actually 12 months.

   The skyway and the Oakland touchdown designs are independent of the YBI bridge structure and have not been delayed. Caltrans is proceeding with its risk design of the suspension structure.

METROPOLITAN
TRANSPORTATION
COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
Tel.: 510.464.7700
TTY/TDD: 510.464.7769
Fax: 510.464.7848
e-mail: info@mtc.ca.gov
Web site: www.mtc.ca.gov

BAY BRIDGE DESIGN TASK FORCE ENGINEERING AND DESIGN ADVISORY PANEL

Tuesday, July 6, 1999
1 p.m.
Joseph P. Bort MetroCenter Auditorium
101 Eighth Street
Oakland, California 94607

Chairperson: Joseph Nicoletti
Vice Chair: John Kriken
Staff Liaison: Steve Heminger

FINAL AGENDA

1. Welcome and introductions - Joseph Nicoletti, Chair, and John Kriken, Vice Chair
2. Approval of draft meeting record for January 4, 1999 meeting*
3. Recent project-related correspondence -- Larry Dahms, MTC*
4. Status report on final Environmental Impact Statement -- Denis Mulligan, Caltrans
5. Presentation of detailed design information on recommended new eastern span - Brian Maroney, Caltrans, and TY Lin design team
6. Report from Seismic Safety Peer Review Panel - Frieder Seible
7. EDAP discussion and comments
8. Other business/public comment

* Attachment sent to members, key staff, and others as appropriate. Copies available at meeting.

Public Comment: The public is encouraged to comment on agenda items at committee meetings by completing a request-to-speak card (available from staff) and passing it to the committee secretary or chairperson. Public comment may be limited by any of the procedures set forth in Section 3.09 of MTC's Procedures Manual (Resolution No. 1058, Revised) if, in the chair's judgment, it is necessary to maintain the orderly flow of business.
Record of Meeting: MTC meetings are tape recorded. Copies of recordings are available at nominal charge, or recordings may be listened to at MTC offices by appointment.
Sign Language Interpreter or Reader: If requested three (3) working days in advance, sign language interpreter or reader will be provided; for information on getting written materials in alternate formats call 510/464-7787.
Transit Access to MTC: BART to Lake Merritt Station. AC Transit buses: #11 from Piedmont or Montclair; #59A from Montclair; #62 from East or West Oakland; #35X from Alameda; #36X from Hayward.
Parking at MTC: Metered parking is available on the street. No public parking is provided.